**OM-225 590H**

2011–04

## Processes

Stick (SMAW) Welding

MIG (GMAW) Welding

Flux Cored (FCAW) Welding

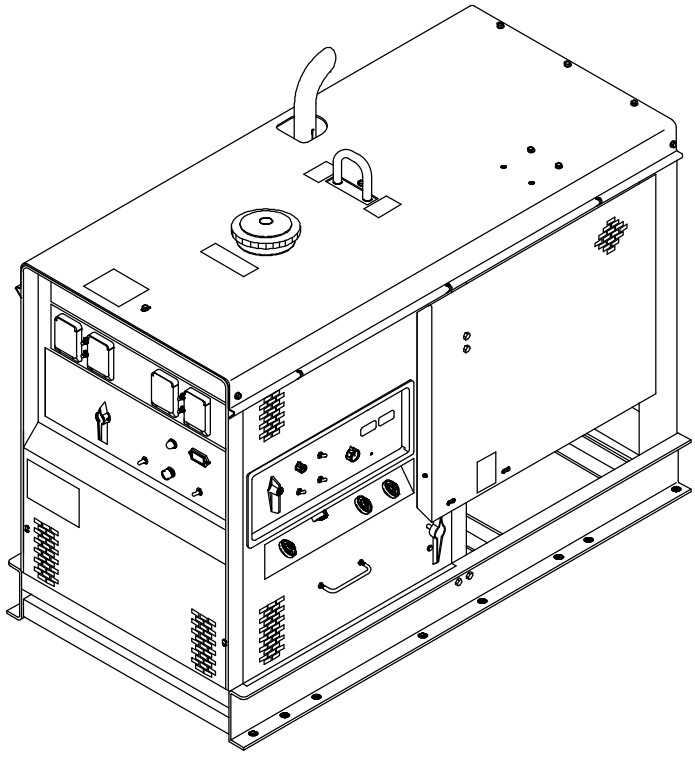
TIG (GTAW) Welding

Air Carbon Arc (CAC-A) Cutting and Gouging

## Description

Dual-Operator Engine Driven Welding Generator

# Miller DU-OP®



# OWNER'S MANUAL

**File: Engine Drive**

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# From Miller to You

*Thank you* and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.

ISO 9001 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

Miller®

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# SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

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**Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.**

## 1-1. Symbol Usage

**DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.**

**Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.**

***NOTICE*** *– Indicates statements not related to personal injury.*

☞ *Indicates special instructions.*

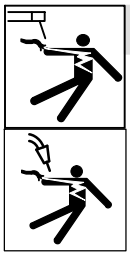
This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1-2. Arc Welding Hazards

**The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-8. Read and follow all Safety Standards.**

**Only qualified persons should install, operate, maintain, and repair this unit.**

**During operation, keep everybody, especially children, away.**



### ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

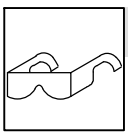
- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground — check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring — replace cord immediately if damaged — bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

**SIGNIFICANT DC VOLTAGE exists in inverter power sources AFTER stopping engine.**

- Stop engine on inverter and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

### HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



### FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

## FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

## BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

## ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

## WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.

## NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

## ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.

## CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder — explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

## 1-3. Engine Hazards

### BATTERY EXPLOSION can injure.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables, battery charging cables (if applicable), or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles unless the unit has a battery charging feature designed for this purpose.
- Observe correct polarity (+ and –) on batteries.
- Disconnect negative (–) cable first and connect it last.
- Keep sparks, flames, cigarettes, and other ignition sources away from batteries. Batteries produce explosive gases during normal operation and when being charged.
- Follow battery manufacturer's instructions when working on or near a battery.

### BATTERY CHARGING OUTPUT can injure.

**(Battery charging feature not present on all models.)**

- Have only qualified persons do battery charging work.
- Charge lead-acid batteries only. Do not use battery charger to supply power to an extra-low-voltage electrical system or to charge dry cell batteries.
- Do not charge a frozen battery.
- Do not use damaged charging cables.
- Do not charge a battery that has loose terminals or one showing damage such as a cracked case or cover.
- Before charging battery, select correct charger voltage to match battery voltage.
- Set battery charging controls to the Off position before connecting to battery. Do not allow battery charging clips to touch each other.
- Keep charging cables away from vehicle hood, door, or moving parts.

### FUEL can cause fire or explosion.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank — allow room for fuel to expand.
- Do not spill fuel. If fuel is spilled, clean up before starting engine.
- Dispose of rags in a fireproof container.
- Always keep nozzle in contact with tank when fueling.

### MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Stop engine before installing or connecting unit.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- To prevent accidental starting during servicing, disconnect negative (–) battery cable from battery.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.
- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.

### EXHAUST SPARKS can cause fire.

- Do not let engine exhaust sparks cause fire.
- Use approved engine exhaust spark arrestor in required areas — see applicable codes.

### HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

### STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator (unless told otherwise in maintenance section or engine manual).
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.

### Using a generator indoors CAN KILL YOU IN MINUTES.

- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- NEVER use inside a home or garage, EVEN IF doors and windows are open.
- Only use OUTSIDE and far away from windows, doors, and vents.

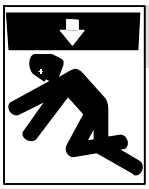
### BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.

### ENGINE HEAT can cause fire.

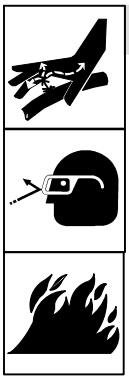
- Do not locate unit on, over, or near combustible surfaces or flammables.
- Keep exhaust and exhaust pipes way from flammables.

## 1-4. Hydraulic Hazards



### HYDRAULIC EQUIPMENT can injure or kill.

- Incorrect installation or operation of this unit could result in equipment failure and personal injury. Only qualified persons should install, operate, and service this unit according to its Owner's Manual, industry standards, and national, state, and local codes.
- Do not exceed the rated output or capacity of the hydraulic pump or any equipment in the hydraulic system. Design hydraulic system so failure of any hydraulic component will not put people or property at risk.
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Do not work on hydraulic system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter hydraulic pump or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the hydraulic system.
- Use only components/accessories approved by the manufacturer.
- Keep away from potential pinch points or crush points created by equipment connected to the hydraulic system.
- Do not work under or around any equipment that is supported only by hydraulic pressure. Properly support equipment by mechanical means.



### HYDRAULIC FLUID can injure or kill.

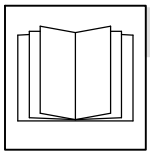
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting hydraulic lines.
- Check hydraulic system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Wear protective equipment such as safety glasses, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on hydraulic system.
- Use a piece of paper or cardboard to search for leaks––never use bare hands. Do not use equipment if leaks are found.
- HYDRAULIC FLUID is FLAMMABLE––do not work on hydraulics near sparks or flames; do not smoke near hydraulic fluid.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

### MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.

### HOT PARTS AND FLUID can burn.

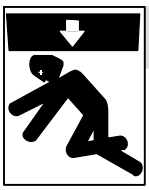
- Do not touch hot parts bare handed or allow hot fluid to contact skin.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



### READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.

## 1-5. Compressed Air Hazards

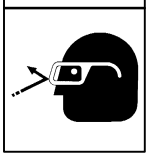


### COMPRESSED AIR EQUIPMENT can injure or kill.

- Incorrect installation or operation of this unit could result in equipment failure and personal injury. Only qualified persons should install, operate, and service this unit according to its Owner's Manual, industry standards, and national, state, and local codes.
- Do not exceed the rated output or capacity of the compressor or any equipment in the compressed air system. Design compressed air system so failure of any component will not put people or property at risk.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Do not work on compressed air system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter compressor or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the compressed air system.
- Use only components and accessories approved by the manufacturer.
- Keep away from potential pinch points or crush points created by equipment connected to the compressed air system.
- Do not work under or around any equipment that is supported only by air pressure. Properly support equipment by mechanical means.

**HOT METAL from air arc cutting and gouging can cause fire or explosion.**

- Do not cut or gouge near flammables.
- Watch for fire; keep extinguisher nearby.



**COMPRESSED AIR can injure or kill.**

- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting air lines.
- Check compressed air system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Do not direct air stream toward self or others.
- Wear protective equipment such as safety glasses, hearing protection, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on compressed air system.
- Use soapy water or an ultrasonic detector to search for leaks––never use bare hands. Do not use equipment if leaks are found.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY air is injected into the skin or body seek medical help immediately.

**BREATHING COMPRESSED AIR can injure or kill.**

- Do not use compressed air for breathing.
- Use only for cutting, gouging, and tools.

**TRAPPED AIR PRESSURE AND WHIPPING HOSES can injure.**

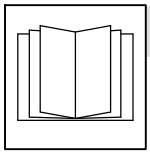
- Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill cap.

**MOVING PARTS can injure.**

- Keep away from moving parts such as fans, belts and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.

**HOT PARTS can burn.**

- Do not touch hot compressor or air system parts.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



**READ INSTRUCTIONS.**

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.

## 1-6. Additional Symbols For Installation, Operation, And Maintenance

**FIRE OR EXPLOSION hazard.**

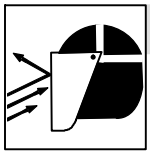
- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

**FALLING EQUIPMENT can injure.**

- Use lifting eye to lift unit and properly installed accessories only, NOT gas cylinders. Do not exceed maximum lift eye weight rating (see Specifications).
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94–110) when manually lifting heavy parts or equipment.

**OVERHEATING can damage motors.**

- Turn off or unplug equipment before starting or stopping engine.
- Do not let low voltage and frequency caused by low engine speed damage electric motors.
- Do not connect 50 or 60 Hertz motors to the 100 Hertz receptacle where applicable.



**FLYING SPARKS can injure.**

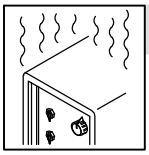
- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.

**MOVING PARTS can injure.**

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

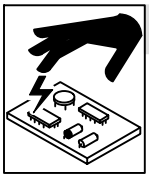
### WELDING WIRE can injure.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



### OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.

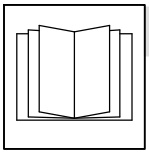


### STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

### TILTING OF TRAILER can injure.

- Use tongue jack or blocks to support weight.
- Properly install welding generator onto trailer according to instructions supplied with trailer.



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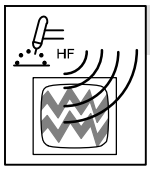



### H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

### ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers, and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-7. California Proposition 65 Warnings

**Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

**Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. *Wash hands after handling.***

**This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. *Wash hands after use.***

**For Gasoline Engines:**

**Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

**For Diesel Engines:**

**Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

## 1-8. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes,* ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting,* American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*National Electrical Code,* NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

*Safe Handling of Compressed Gases in Cylinders,* CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

*Safety in Welding, Cutting, and Allied Processes,* CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

*Battery Chargers,* CSA Standard C22.2 NO 107.2–01, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

*Safe Practice For Occupational And Educational Eye And Face Protection,* ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

For Standards about hydraulic systems, contact the National Fluid Power Association, Publications Department, 3333 North Mayfair Road, Suite 211, Milwaukee, WI 53222-3219 (phone: (414) 778-3344, website: www.nfpa.com).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

U.S. Consumer Product Safety Commission (CPSC), 4330 East West Highway, Bethesda, MD 20814 (phone: 301-504-7923, website: www.cpsc.gov).

*Applications Manual for the Revised NIOSH Lifting Equation*, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

## 1-9. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). Welding current creates an EMF field around the welding circuit and welding equipment. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, access restrictions for passers–by or individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

**About Implanted Medical Devices:**

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

# SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION



**Pour écarter les risques de blessure pour vous–même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.**

## 2-1. Signification des symboles

**DANGER! – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.**

**Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.**

***NOTE*** *– Indique des déclarations pas en relation avec des blessures personnelles.*

☞ *Indique des instructions spécifiques.*

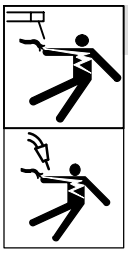
Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférant pour les actions nécessaires afin d'éviter le danger.

## 2-2. Dangers relatifs au soudage à l'arc

**Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-8. Veuillez lire et respecter toutes ces normes de sécurité.**

**L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

**Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**



### UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

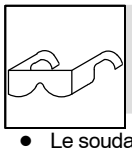
- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Des précautions de sécurité supplémentaires sont requises dans des environnements à risque comme: les endroits humides ou lorsque l'on porte des vêtements mouillés; sur des structures métalliques au sol, grillages et échafaudages; dans des positions assises, à genoux et allongées; ou quand il y a un risque important de contact accidentel avec la pièce ou le sol. Dans ces cas utiliser les appareils suivants dans l'ordre de préférence: 1) un poste à souder DC semi–automatique de type CV (MIG/MAG), 2) un poste à souder manuel (électrode enrobée) DC, 3) un poste à souder manuel AC avec tension à vide réduite. Dans la plupart des cas, un poste courant continu de type CV est recommandé. Et, ne pas travailler seul!
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez–les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct – ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

**Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur UNE FOIS le moteur coupé.**

- Couper l'alimentation du poste et décharger les condensateurs d'entrée comme indiqué dans la Section Maintenance avant de toucher des composants.

## LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



## DES PIECES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.

- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

## LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

## LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

## LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

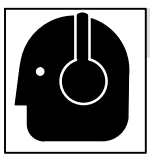
Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage approuvé muni de verres filtrants approprié pour protéger visage et yeux pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.

## LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez–vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe–circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252(a)(2)(iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.



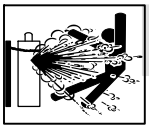
## LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.

**Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.**

- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.
- Les porteurs d'implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s'approcher de la zone où se déroule du soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.



**Si des BOUTEILLES sont endommagées, elles pourront exploser.**

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

## 2-3. Dangers existant en relation avec le moteur

**L'EXPLOSION DE LA BATTERIE peut provoquer des blessures.**

- Toujours porter une protection faciale, des gants en caoutchouc et vêtements de protection lors d'une intervention sur la batterie.
- Arrêter le moteur avant de débrancher ou de brancher des câbles de batterie, des câbles de chargeur de batterie (le cas échéant) ou de batterie d'entretien.
- Eviter de provoquer des étincelles avec les outils en travaillant sur la batterie.
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil dispose d'une fonctionnalité de charge de batterie destinée à cet usage.
- Observer la polarité correcte (+ et –) sur les batteries.
- Débrancher le câble négatif (–) en premier lieu. Le rebrancher en dernier lieu.
- Les sources d'étincelles, flammes nues, cigarettes et autres sources d'inflammation doivent être maintenues à l'écart des batteries. Ces dernières produisent des gaz explosifs en fonctionnement normal et en cours de charge.
- Respecter les consignes du fabricant de la batterie pour travailler sur une batterie ou à proximité.

**Le COURANT DE CHARGE DE BATTERIE peut provoquer des blessures (la fonctionnalité de charge de batterie n'est pas disponible sur tous les modèles).**

- Les opérations de charge de batterie ne doivent être effectuées que par des personnes qualifiées.
- Ne charger que des batteries plomb–acide. Ne pas utiliser le chargeur de batterie pour alimenter un autre circuit électrique basse tension ou pour charger des batteries sèches.
- Ne pas charger une batterie gelée.
- Ne pas utiliser de câbles de charge endommagés.
- Ne pas charger une batterie dont les bornes sont desserrées ou présentant une détérioration comme par exemple un boîtier ou un couvercle fissuré.
- Avant de charger une batterie, sélectionner la tension de charge correspondant à la tension de la batterie.
- Régler les commandes de charge de batterie sur la position d'arrêt avant de brancher la batterie. Veiller à ce que les pinces de charge ne se touchent pas.
- Ranger les câbles de charge à distance du capot, des portes et des pièces mobiles du véhicule.

**LE CARBURANT MOTEUR peut provoquer un incendie ou une explosion.**

- Arrêter le moteur avant de vérifier le niveau de carburant ou de faire le plein.
- Ne pas faire le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
- Ne pas faire le plein de carburant à ras bord; prévoir de l'espace pour son expansion.
- Faire attention de ne pas renverser de carburant. Nettoyer tout carburant renversé avant de faire démarrer le moteur.
- Jeter les chiffons dans un récipient ignifuge.
- Toujours garder le pistolet en contact avec le réservoir lors du remplissage.

**Les PIÈCES MOBILES peuvent causer des blessures.**

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Arrêter le moteur avant d'installer ou brancher l'appareil.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Pour empêcher tout démarrage accidentel pendant les travaux d'entretien, débrancher le câble négatif (–) de batterie de la borne.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.
- Avant d'intervenir, déposer les bougies ou injecteurs pour éviter la mise en route accidentelle du moteur.
- Bloquer le volant moteur pour éviter sa rotation lors d'une intervention sur le générateur.

**LES ÉTINCELLES À L'ÉCHAPPEMENT peuvent provoquer un incendie.**

- Empêcher les étincelles d'échappement du moteur de provoquer un incendie.
- Utiliser uniquement un pare-étincelles approuvé – voir codes en vigueur.

**LES PIÈCES CHAUDES peuvent provoquer des brûlures.**

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.

**LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT CHAUD peuvent provoquer des brûlures.**

- Il est préférable de vérifier le liquide de refroidissement une fois le moteur refroidi pour éviter de se brûler.
- Toujours vérifier le niveau de liquide de refroidissement dans le vase d'expansion (si présent), et non dans le radiateur (sauf si précisé autrement dans la section maintenance du manuel du moteur).
- Si le moteur est chaud et que le liquide doit être vérifié, opérer comme suivant.
- Mettre des lunettes de sécurité et des gants, placer un torchon sur le bouchon du radiateur.
- Dévisser le bouchon légèrement et laisser la vapeur s'échapper avant d'enlever le bouchon.

**L'utilisation d'un groupe autonome à l'intérieur PEUT VOUS TUER EN QUELQUES MINUTES.**

- Les fumées d'un groupe autonome contient du monoxyde de carbone. C'est un poison invisible et inodore.
- JAMAIS utiliser dans une maison ou garage, même avec les portes et fenêtres ouvertes.
- Uniquement utiliser à l'EXTERIEUR, loin des portes, fenêtres et bouches aération.

**L'ACIDE DE LA BATTERIE peut provoquer des brûlures dans les YEUX et sur la PEAU.**

- Ne pas renverser la batterie.
- Remplacer une batterie endommagée.
- Rincer immédiatement les yeux et la peau à l'eau.

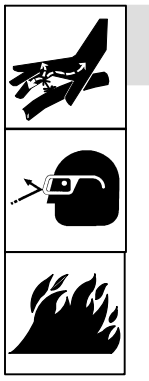
**LA CHALEUR DU MOTEUR peut provoquer un incendie.**

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Tenir à distance les produits inflammables de l'échappement.

## 2-4. Dangers liés à l'hydraulique

**Les ÉQUIPEMENTS HYDRAULIQUES peuvent provoquer des blessures ou même la mort.**

- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, faire fonctionner et réparer cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état ou locaux.
- Ne pas dépasser le débit nominal ou la capacité de la pompe hydraulique ou de tout équipement du circuit hydraulique. Concevoir le circuit hydraulique de telle sorte que la défaillance d'un composant hydraulique ne risque pas de provoquer un accident matériel ou corporel.
- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Ne pas intervenir sur le circuit hydraulique lorsque l'appareil fonctionne. Seul un personnel qualifié et appliquant les consignes du fabricant est autorisé le faire.
- Ne pas modifier ou altérer la pompe hydraulique ou les équipements fournis par le fabricant. Ne pas débrancher, désactiver ou neutraliser les équipements de sécurité du circuit hydraulique.
- Utiliser uniquement des composants et accessoires homologués par le fabricant.
- Se tenir à l'écart de tout point présentant un danger de pincement ou d'écrasement créé par l'équipement raccordé au circuit hydraulique.
- Ne pas intervenir sous ou autour d'un équipement qui n'est soutenu que par la pression hydraulique. Soutenir l'équipement de façon appropriée par un moyen mécanique.



**Le LIQUIDE HYDRAULIQUE risque de provoquer des blessures ou même la mort.**

- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Détendre la pression avant de débrancher ou de brancher des canalisations hydrauliques.
- Avant d'utiliser l'appareil, contrôler les composants du circuit hydraulique, les branchements et les flexibles en recherchant tout signe de détérioration, de fuite et d'usure.
- Pour intervenir sur un circuit hydraulique, porter un équipement de protection tel que des lunettes de sécurité, des gants de cuir, une chemise et un pantalon en tissu résistant, des chaussures montantes et une coiffe.
- Pour rechercher des fuites, utiliser un morceau de papier ou de carton, jamais les mains nues. En cas de détection de fuite, ne pas utiliser l'équipement.
- Le LIQUIDE HYDRAULIQUE est INFLAMMABLE. Ne pas intervenir sur des composants hydrauliques à proximité d'étincelles ou de flammes; ne pas fumer à proximité de liquide hydraulique.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de mettre en marche l'appareil.
- En cas de pénétration d'un QUELCONQUE liquide dans la peau, celui–ci doit être retiré chirurgicalement sous quelques heures par

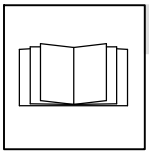
un médecin familiarisé avec ce type de blessure, faute de quoi la gangrène pourrait apparaître.

**Les PIÈCES MOBILES peuvent causer des blessures.**

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Demander seulement à un personnel qualifié d'enlever les dispositifs de sécurité ou les recouvrements pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.

**LES PIÈCES ET LIQUIDES CHAUDS peuvent provoquer des brûlures.**

- Ne pas toucher les pièces chaudes à main nue ni laisser des liquides chauds entrer en contact avec la peau.
- Prévoir une période de refroidissement avant d'intervenir sur l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



**LIRE LES INSTRUCTIONS.**

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.

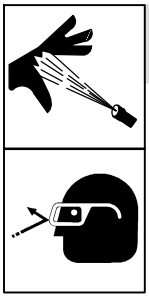
## 2-5. Dangers liés à l'air comprimé

**Un ÉQUIPEMENT PNEUMATIQUE risque de provoquer des blessures ou même la mort.**

- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, utiliser et entretenir cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état ou locaux.
- Ne pas dépasser le débit nominal ou la capacité du compresseur ou de tout équipement du circuit d'air comprimé. Concevoir le circuit d'air comprimé de telle sorte que la défaillance d'un composant ne risque pas de provoquer un accident matériel ou corporel.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Ne pas intervenir sur le circuit d'air comprimé lorsque l'appareil fonctionne. Seul un personnel qualifié est autorisé, et appliquant les consignes du fabricant.
- Ne pas modifier ou altérer le compresseur ou les équipements fournis par le fabricant. Ne pas débrancher, désactiver ou neutraliser les équipements de sécurité du circuit d'air comprimé.
- Utiliser uniquement des composants et accessoires homologués par le fabricant.
- Se tenir à l'écart de tout point présentant un danger de pincement ou d'écrasement créé par l'équipement raccordé au circuit d'air comprimé.
- Ne pas intervenir sous ou autour d'un équipement qui n'est soutenu que par la pression pneumatique. Soutenir l'équipement de façon appropriée par un moyen mécanique.

**MÉTAL CHAUD provenant du découpage ou du gougeage à l'arc risque de provoquer un incendie ou une explosion.**

- Ne pas découper ou gouger à proximité de produits inflammables.
- Attention aux risques d'incendie: tenir un extincteur à proximité.



**L'AIR COMPRIMÉ risque de provoquer des blessures ou même la mort.**

- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Détendre la pression avant de débrancher ou de brancher des canalisations d'air.
- Avant d'utiliser l'appareil, contrôler les composants du circuit d'air comprimé, les branchements et les flexibles en recherchant tout signe de détérioration, de fuite et d'usure.
- Ne pas diriger un jet d'air vers soi–même ou vers autrui.
- Pour intervenir sur un circuit d'air comprimé, porter un équipement de protection tel que des lunettes de sécurité, des gants de cuir, une chemise et un pantalon en tissu résistant, des chaussures montantes et une coiffe.
- Pour rechercher des fuites, utiliser de l'eau savonneuse ou un détecteur à ultrasons, jamais les mains nues. En cas de détection de fuite, ne pas utiliser l'équipement.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de mettre en marche l'appareil.
- En cas d'injection d'air dans la peau ou le corps, demander immédiatement une assistance médicale.

**L'INHALATION D'AIR COMPRIMÉ risque de provoquer des blessures ou même la mort.**

- Ne pas inhaler d'air comprimé.
- Utiliser l'air comprimé uniquement pour découper ou gouger ainsi que pour l'outillage pneumatique.

**Une PRESSION D'AIR RÉSIDUELLE ET DES FLEXIBLES QUI FOUETTENT risquent de provoquer des blessures.**

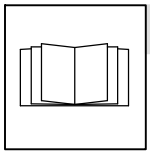
- Détendre la pression pneumatique des outils et circuits avant d'entretenir, ajouter ou changer des accessoires et avant d'ouvrir le bouchon de vidange ou de remplissage d'huile du compresseur.

**Les PIÈCES MOBILES peuvent causer des blessures.**

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Demander seulement à un personnel qualifié d'enlever les dispositifs de sécurité ou les recouvrements pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.

**DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.**

- Ne pas toucher de pièces chaudes du compresseur ou du circuit d'air.
- Prévoir une période de refroidissement avant d'intervenir sur l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



**LIRE LES INSTRUCTIONS.**

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.

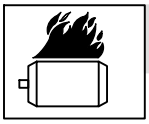
## 2-6. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

**Risque D'INCENDIE OU D'EXPLOSION.**

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.

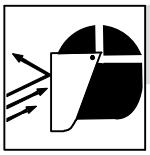
**LA CHUTE DE L'ÉQUIPEMENT peut provoquer des blessures.**

- Utiliser l'anneau de levage pour lever l'appareil et les accessoires correctement installées seuls, PAS les bouteilles de gaz. Ne pas dépasser le poids nominal maximal de l'œilleton (voir les spécifications).
- Utiliser un équipement de levage de capacité suffisante pour lever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.
- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication Nº94–110) lors du levage manuelle de pièces ou équipements lourds.



**LE SURCHAUFFEMENT peut endommager le moteur électrique.**

- Arrêter ou déconnecter l'équipement avant de démarrer ou d'arrêter le moteur.
- Ne pas laisser tourner le moteur trop lentement sous risque d'endommager le moteur électrique à cause d'une tension et d'une fréquence trop faibles.
- Ne pas brancher de moteur de 50 ou de 60 Hz à la prise de 100 Hz, s'il y a lieu.



**LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.**

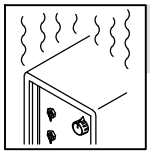
- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie – éloigner toute substance inflammable.

**Les PIÈCES MOBILES peuvent causer des blessures.**

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

**LES FILS DE SOUDAGE peuvent provoquer des blessures.**

- Ne pas appuyer sur la gâchette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



**L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.**

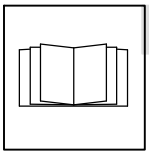
- Laisser l'équipement refroidir ; respecter le facteur de marche nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre le soudage.
- Ne pas obstruer les passages d'air du poste.

### LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.

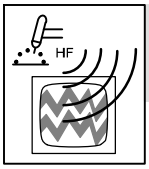
### UNE REMORQUE QUI BASCULE peut provoquer des blessures.

- Utiliser les supports de la remorque ou des blocs pour soutenir le poids.
- Installer convenablement le poste sur la remorque comme indiqué dans le manuel s'y rapportant.



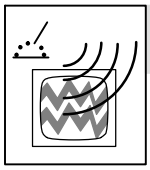
### LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.




### LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



### LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

## 2-7. Proposition californienne 65 Avertissements

⚠ **Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)**

⚠ **Les batteries, les bornes et autres accessoires contiennent du plomb et des composés à base de plomb, produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après manipulation.***

⚠ **Ce produit contient des éléments chimiques, dont le plomb, reconnus par l'État de Californie pour leur caractère cancérogène ainsi que provoquant des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après toute manipulation.***

**Pour les moteurs à essence :**

⚠ **Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.**

**Pour les moteurs diesel :**

⚠ **Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.**

## 2-8. Principales normes de sécurité

*Safety in Welding, Cutting, and Allied Processes,* ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting,* American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

*National Electrical Code,* NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

*Safe Handling of Compressed Gases in Cylinders,* CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

*Safety in Welding, Cutting, and Allied Processes,* CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

*Battery Chargers,* CSA Standard C22.2 NO 107.2–01, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

*Safe Practice For Occupational And Educational Eye And Face Protection,* ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

For Standards about hydraulic systems, contact the National Fluid Power Association, Publications Department, 3333 North Mayfair Road, Suite 211, Milwaukee, WI 53222-3219 (phone: (414) 778-3344, website: www.nfpa.com).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

U.S. Consumer Product Safety Commission (CPSC), 4330 East West Highway, Bethesda, MD 20814 (phone: 301-504-7923, website: www.cpsc.gov).

*Applications Manual for the Revised NIOSH Lifting Equation*, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

## 2-9. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant de soudage crée un CEM autour du circuit et du matériel de soudage. Les CEM peuvent créer des interférences avec certains implants médicaux comme des stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

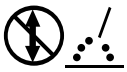
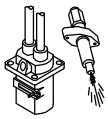
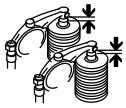
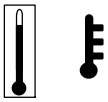
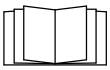
1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.
3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

**En ce qui concerne les implants médicaux :**

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

# SECTION 3 – DEFINITIONS

## 3-1. Symbols And Definitions

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Stop Engine | | Start Engine | | Ether Starting Aid | | Engine |
|  | Do Not Switch While Welding Or Under Load | | Battery (Engine) | | Circuit Protector | | Engine Oil |
|  | Check Injectors/ Pump |  | Check Valve Clearance | | Fuel | | Protective Earth (Ground) |
| + | Positive | — | Negative | | Certified/Trained Mechanic | | Welding Arc |
| A | Amperes | V | Volts | | Panel/Local | | Remote |
| I | On |  | Temperature | | Output (Contactor) | | Alternating Current |
| | Stick (SMAW) Welding | | TIG (GTAW) Welding | | MIG (GMAW) Welding | 3 | Three Phase |
| | Time | h | Hours | s | Seconds | 1 | Single Phase |
|  | Read Operator's Manual | | | | | | |

# SECTION 4 – SPECIFICATIONS

## 4-1. Description

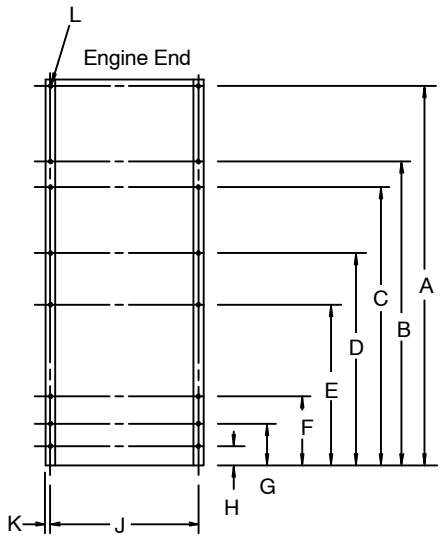
This unit has two CC/CV modules with separate weld controls for applications where two welding arcs are needed. A Welder Selector switch controls whether one or both sets of weld output terminals are active (see Section 6-2). When the unit is operated in the dual operator mode, each welder has CC and CV weld output available for Stick, TIG, and MIG welding. When in the single operator mode, CC weld output is available to the welder on the Welder B (right) side only (CV not active in single operator mode).

## 4-2. Weld, Power, And Engine Specifications

| Weld Mode | Weld Stations Available | Weld Output | Weld Output Range | Max. Open-Circuit Voltage | Rated Welding Output | Generator Power Rating | Engine | Fuel Capacity |
|---|---|---|---|---|---|---|---|---|
| Single | 1 (Right Side) | CC/DC | 30 – 600 A | 85 | 550 A at 30 Volts DC, 40% Duty Cycle | Single-Phase, 4 kVA/kW, 34/17 A, 120/240 V AC, 50/60 Hz (4 kVA/kW Shared By All Receptacles) | Deutz D914L03i Air-Cooled, Three-Cylinder, 48.2 HP Diesel Engine | 22.3 gal (84.4 L) |
| Dual | 2 (Both Sides) | CC/DC | 15 – 300 A | 85 | 275 A at 31 Volts DC, 40% Duty Cycle | | | |
| | | CV/DC | 10 – 32 V | 49 | | | | |

## 4-3. Dimensions, Weights, And Operating Angles

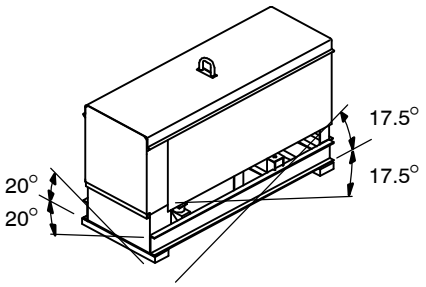
| Dimensions | |
|---|---|
| Height | 47-5/8 in (1210 mm) |
| Width | 31-1/4 in (794 mm) |
| Depth | 60-1/2 in (1537 mm) |
| A | 59-1/8 in (1502 mm) |
| B | 47-1/4 in (1200 mm) |
| C | 43-1/4 in (1099 mm) |
| D | 32-3/4 in (832 mm) |
| E | 24-15/16 in (633 mm) |
| F | 10-1/2 in (267 mm) |
| G | 6-1/2 in (165 mm) |
| H | 2-7/8 in (73 mm) |
| J | 29-7/8 in (759 mm) |
| K | 11/16 in (24 mm) |
| L | 21/32 in (17 mm) Dia. 16 Holes |
| **Weight** | |
| 2115 lb (959 kg) | |
| **Lifting Eye Weight Rating:** 2161 lb (980 kg) Maximum | |




158 699

**Do not exceed tilt angles or engine could be damaged or unit could tip.**

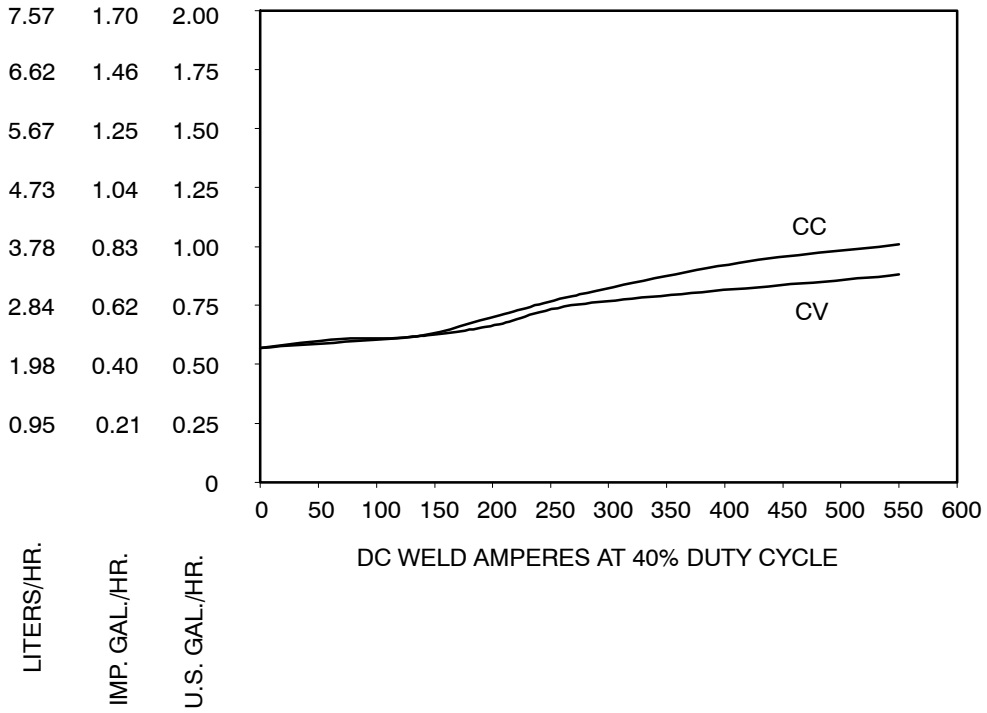
**Do not move or operate unit where it could tip.**




angles_1 8/99

## 4-4. Fuel Consumption

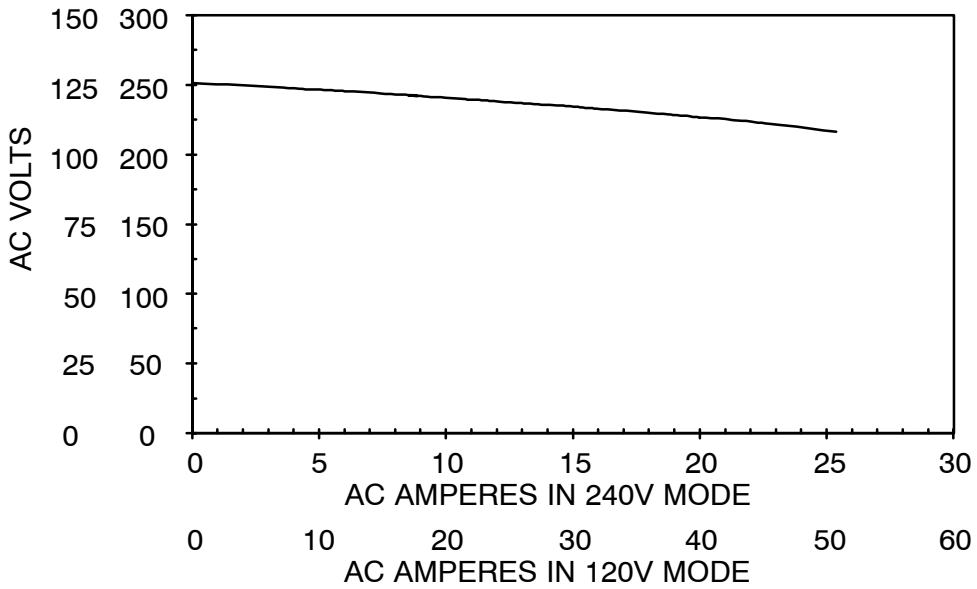
The curve shows typical fuel use under the combined weld loads of both sides (Welder A and Welder B).




195 711

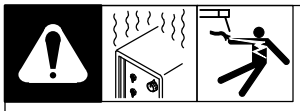
## 4-5. AC Generator Power

The AC power curve shows the generator power in amperes available at the 120 and 240 volt receptacles.

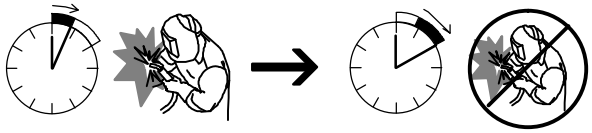



193 018

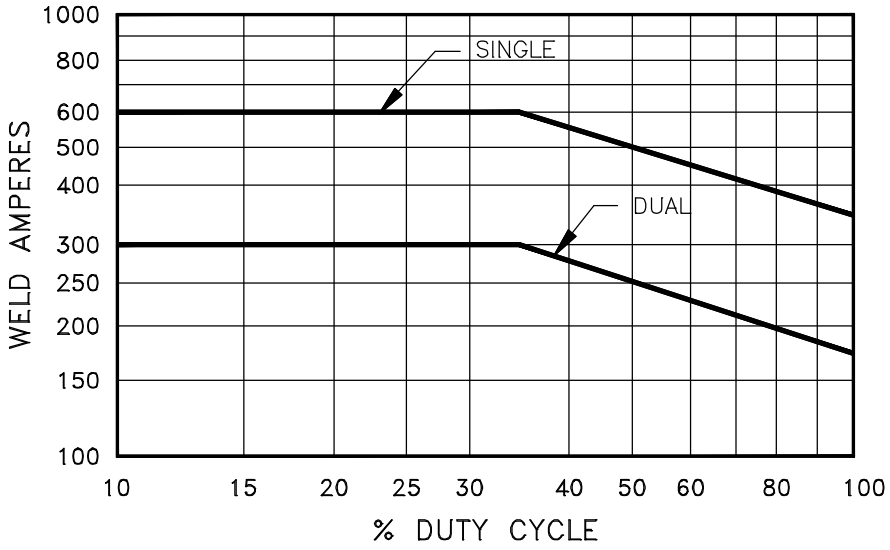
## 4-6. Duty Cycle And Overheating



**Dual Operator Mode – 40% Duty Cycle At 275 Amperes From Each Side**
**Single Operator Mode – 40% Duty Cycle At 550 Amperes From Welder B side (Right)**



4 Minutes Welding 6 Minutes Resting




Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

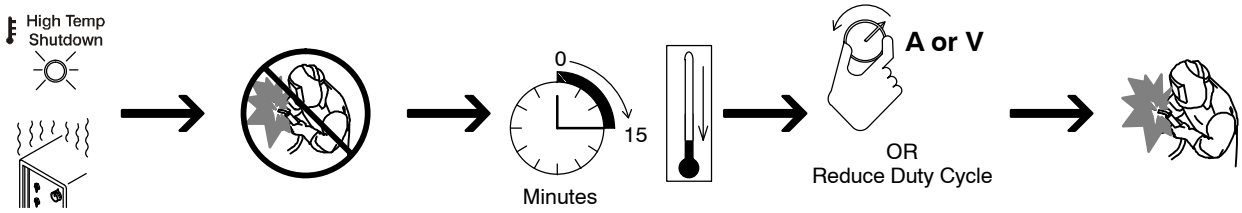
***NOTICE*** *– Exceeding duty cycle can damage unit and void warranty.*

If a weld module overheats, the High Temperature light goes on and the thermostat opens to stop weld output to that module. Wait fifteen minutes for module to cool. Reduce amperage, voltage, or duty cycle before welding.

This unit has separate duty cycle ratings for each operating mode. If the unit is operated in the dual operator mode, the unit is rated at 40% duty cycle. This means each side of the unit can be operated at 275 amperes at 40% duty cycle.

When the unit is operated in the single operator mode, the Welder B side (right) is rated at 40% duty cycle (550 A at 40% duty cycle).

**Overheating**

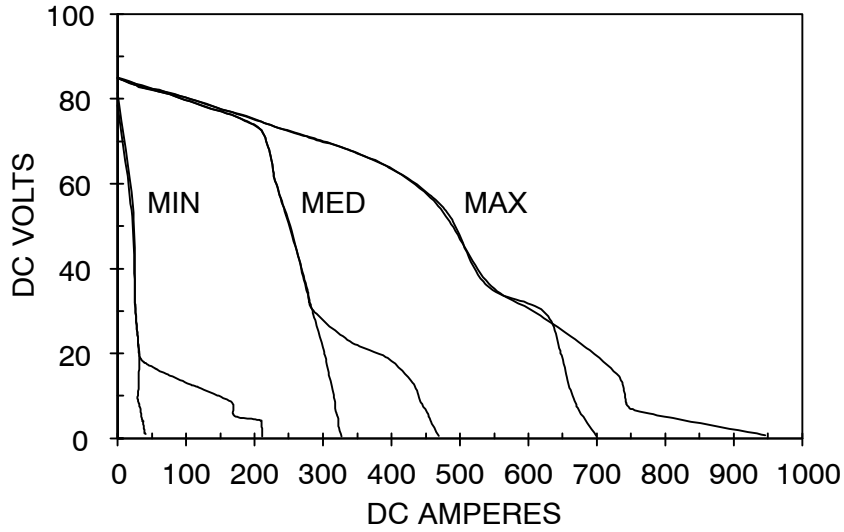



Ref. rduty1 5/95 – 194 313-A

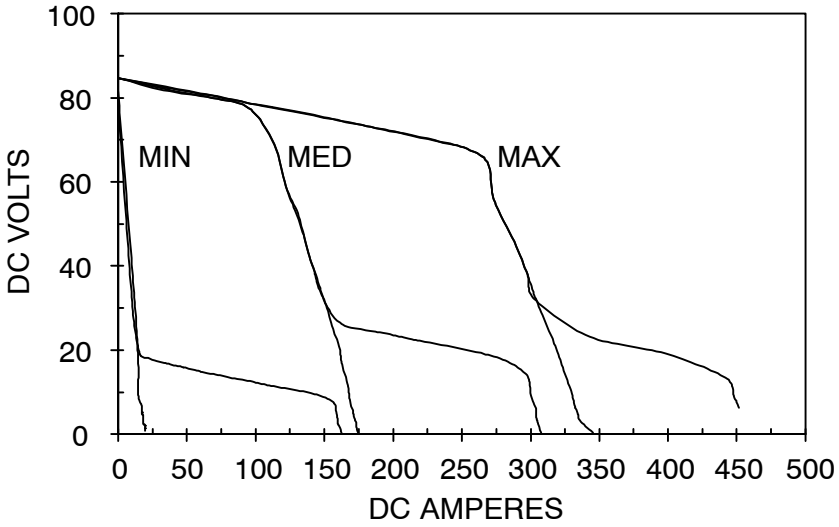
## 4-7. Volt-Ampere Curves

The volt-ampere curve shows the minimum, medium, and maximum voltage and amperage output capabilities of the welding generator. Curves of all other settings fall between the curves shown.

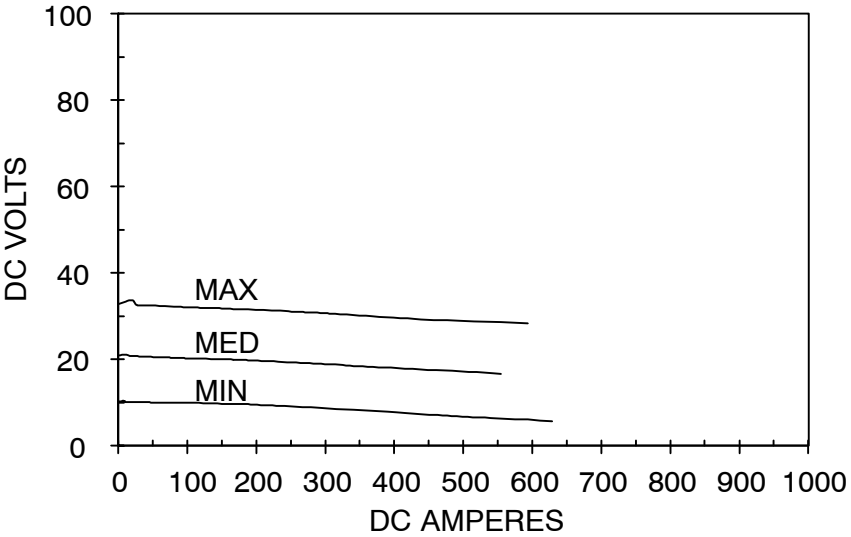
**A. CC/DC – Single Mode**




**B. CC/DC – Dual Mode**




**C. CV/DC Mode**




194 397 / 194 398 / 194 399

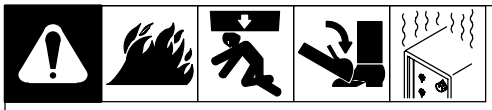
# SECTION 5 – INSTALLATION

☞ *When facing the front panel, the Welder B controls and weld terminals are on the right and the Welder A controls and weld terminals are on the left.*

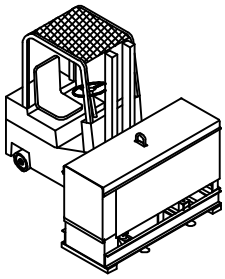
## 5-1. Serial Number And Rating Label Location

The serial number and rating information for this product is located on the front. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

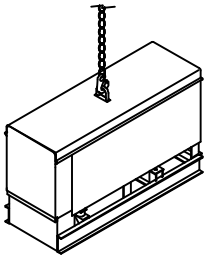
## 5-2. Installing Welding Generator



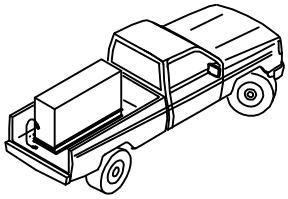
**Movement**



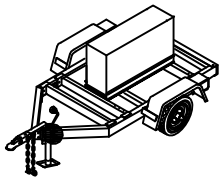
OR

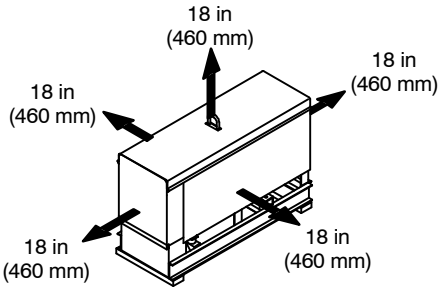


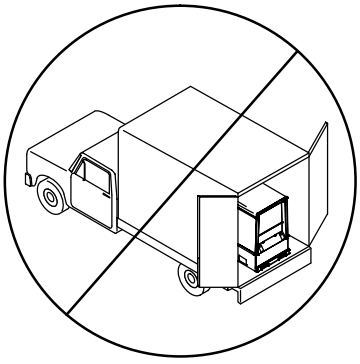
**Location / Airflow Clearance**



OR





**Do not move or operate unit where it could tip.**

**Do not lift unit from end.**

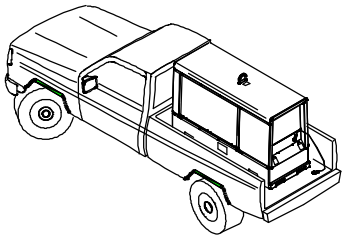
**Always securely fasten welding generator onto transport vehicle or trailer and comply with all DOT and other applicable codes.**

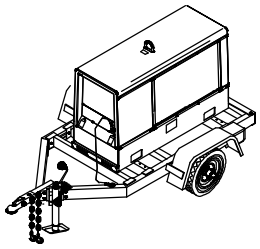
***NOTICE*** *– Do not install unit where air flow is restricted or engine may overheat.*

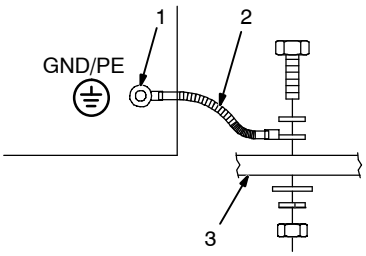
☞ *See Section 4-3 for lifting eye rating.*

install1 1/08 – Ref. ST-800 652 / Ref. ST-800 477-A / ST-158 936-A / 804 712

## 5-3. Grounding Generator To Truck Or Trailer Frame








**Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.**

**Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

**Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.**

**If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

1 Equipment Grounding Terminal (On Front Panel)

2 Grounding Cable (Not Supplied)

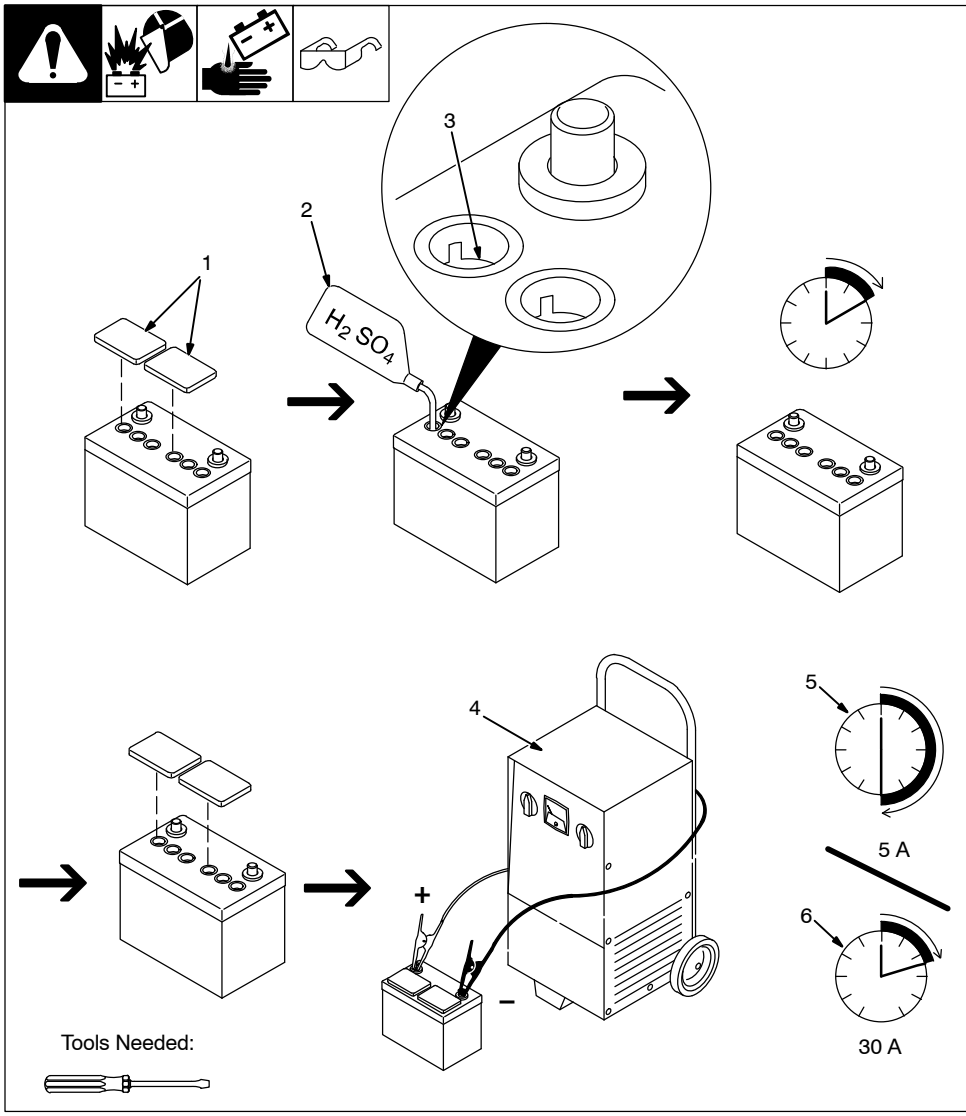
3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #10 AWG or larger insulated copper wire.

☞ *Electrically bond generator frame to vehicle frame by metal-to-metal contact.*

rot_grnd 2008-01 – 800 652-D

## 5-4. Activating The Dry Charge Battery (If Applicable)




**Always wear a face shield, rubber gloves and protective clothing when working on a battery.**

Remove battery from unit.

1 Vent Caps

2 Sulfuric Acid Electrolyte (1.265 Specific Gravity)

3 Well

Fill each cell with electrolyte to **bottom** of well (maximum).

**Do not overfill battery cells.**

Wait ten minutes and check electrolyte level. If necessary, add electrolyte to raise to proper level. Reinstall vent caps.

4 Battery Charger

**Read and follow all instructions supplied with battery charger.**

5 5 Amperes For 30 Minutes Charge Time

6 30 Amperes For 12 Minutes Charge Time

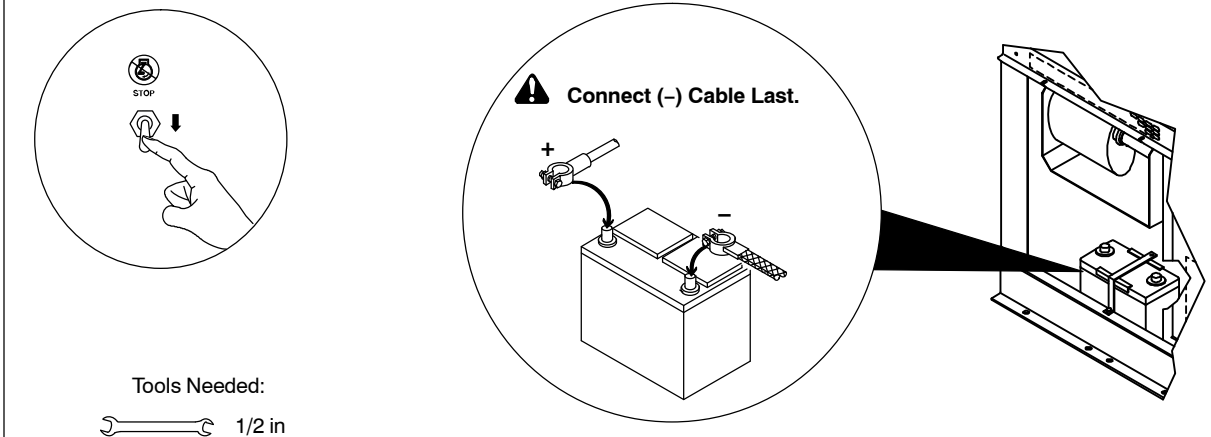
Charge battery. Disconnect charging cables and install battery.

☞ *When electrolyte is low, add only distilled water to cells to maintain proper level.*

Tools Needed:

drybatt 12008–01 – S-0886

## 5-5. Connecting The Battery

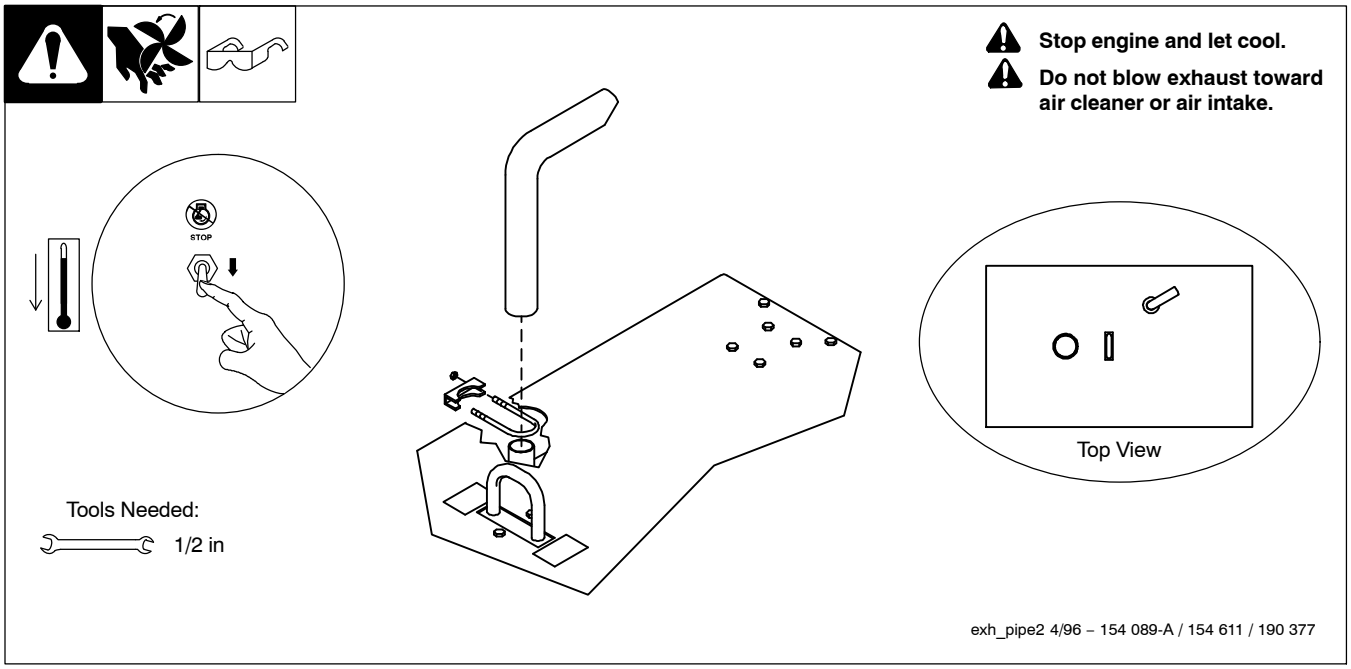



Tools Needed:

1/2 in

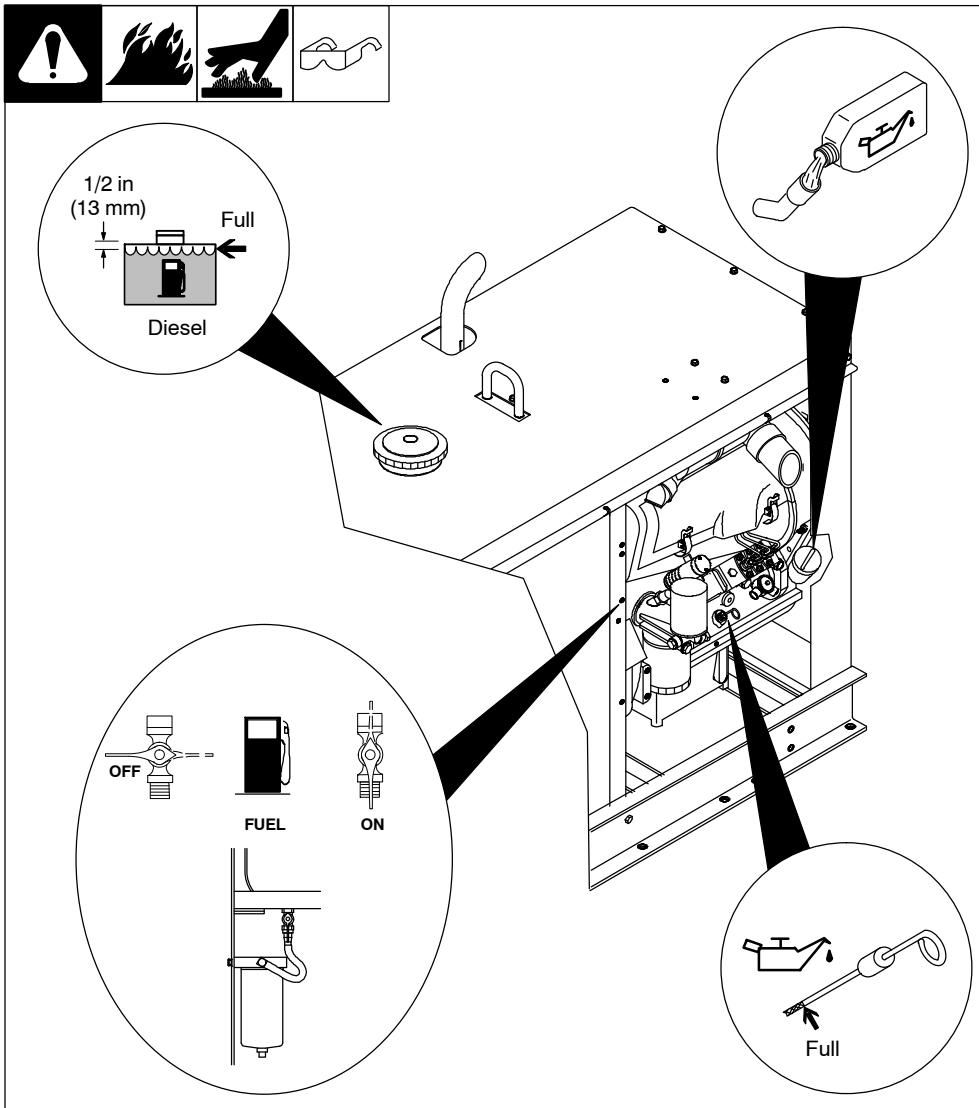
Ref 225 543 / 153 654-C

## 5-6. Installing Exhaust Pipe




exh_pipe2 4/96 – 154 089-A / 154 611 / 190 377

## 5-7. Engine Prestart Checks




Check all fluids daily. Engine must be cold and on a level surface.

Follow run-in procedure in engine manual. If unburned fuel and oil collect in exhaust pipe during run-in, see Section 10.

**Fuel**

***NOTICE*** *– Do not use gasoline. Gasoline will damage engine.*

Add diesel fuel before starting engine the first time (see maintenance label for specifications). Fill fuel tank up to 1/2 in. (13 mm) from top to allow room for expansion. Open fuel shut-off valve.

Do not run out of fuel or air enters fuel system and causes starting problems. Use primer pump to prime injector system (see Section 8-7).

**Oil**

After fueling, check oil with unit on level surface. If oil is not up to full mark on dipstick, add oil (see maintenance label).

☞ *Engine stops if oil pressure is too low.*

☞ *To improve cold weather starting:*

*Keep battery in good condition. Store battery in warm area.*

*Use fuel formulated for cold weather (diesel fuel can gel in cold weather). Contact local fuel supplier for fuel information.*

*Use correct grade oil for cold weather.*

Ref 804 285 / 013 466

## 5-8. Safety Information For Connecting To Weld Output Terminals

**UNEXPECTED WELD OUTPUT can cause injury or fire.**

- Both weld outputs can be live (ON) when Welder Selector switch is in Welder A/Welder B position and engine is running.
- Disconnect or insulate any unused cables.
- Know where cables are located BEFORE starting engine.

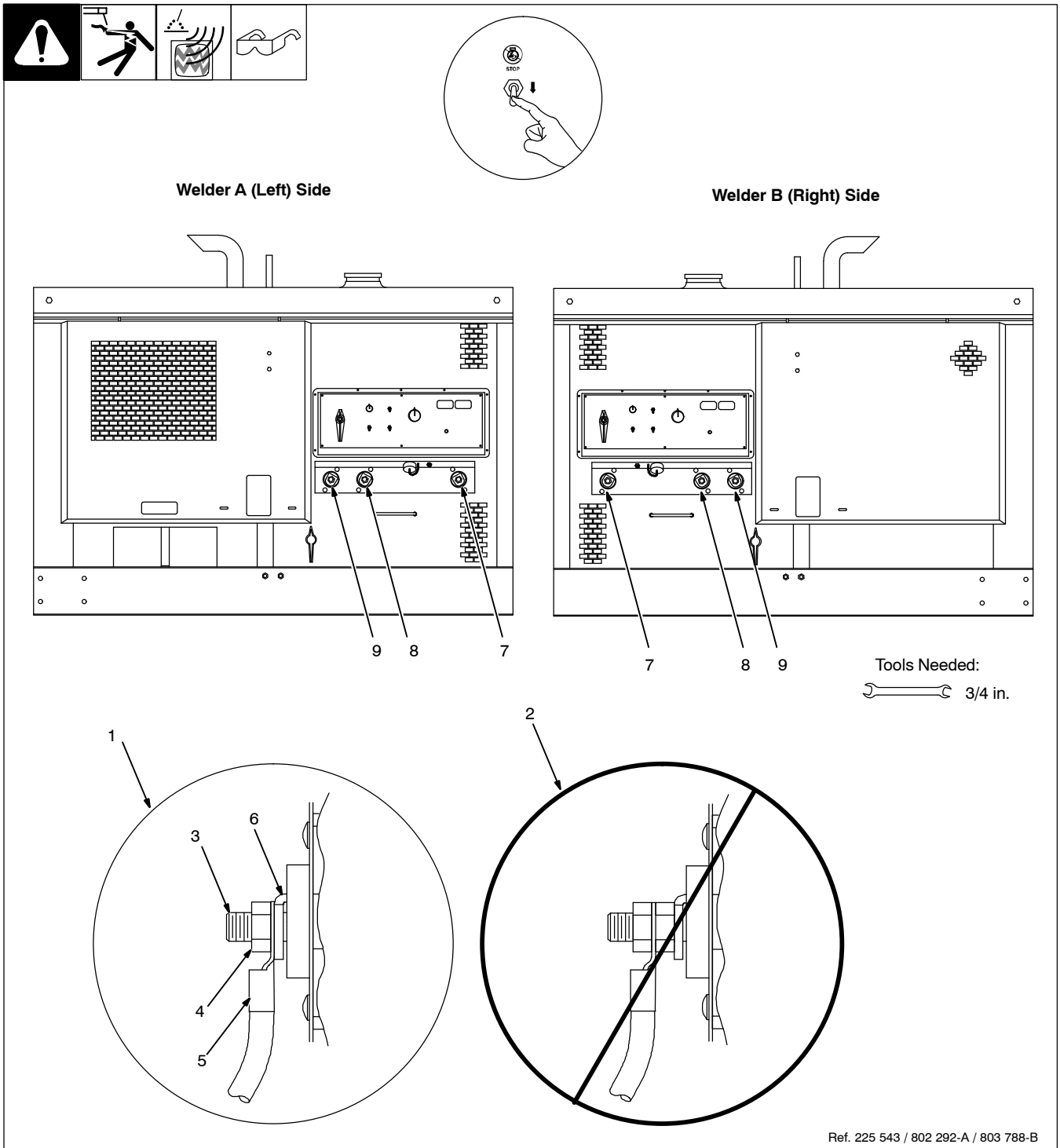
**ELECTRIC SHOCK can kill; ARCING can burn skin or damage electrical connections.**

- Stop engine before making any weld output connections.
- Do not connect welding output of different polarities to the same structure.
- See ANSI Z49.1 and OSHA Title 29, Chapter XVII, Part 1910, Subpart Q (addresses at beginning of manual).
- When welding on the same workpiece, all connections to the workpiece must be of the same polarity.
- Do not handle or come in contact with two live electrodes at the same time.

**ELECTRIC SHOCK can kill; TWO TIMES NORMAL OPEN-CIRCUIT VOLTS can exist between electrode holders of opposite polarity.**

- Do not touch electrode holders of opposite polarity at the same time.
- Separate electrode holders of opposite polarity to prevent contact.
- Consult ANSI Z49.1 for common grounding safe practices.

## 5-9. Weld Output Terminals




Ref. 225 543 / 802 292-A / 803 788-B

**Stop engine.**

**Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.**

☞ *Do not place anything between weld cable terminal and copper bar. Make sure that the surfaces of the weld cable terminal and copper bar are clean.*

1 Correct Weld Cable Connection

2 Incorrect Weld Cable Connection

3 Weld Output Terminal

4 Supplied Weld Output Terminal Nut

5 Weld Cable Terminal

6 Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.

7 Negative (–) Weld Output Terminal

8 CV Weld Output Terminal

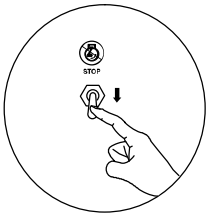
9 CC Weld Output Terminal

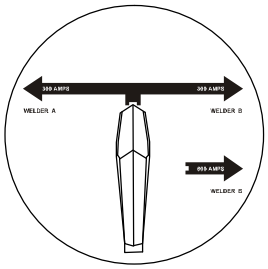
See Sections 5-10 thru 5-15 for dual operator output connections for CC and CV welding.

See Section 5-16 for single operator output connections (CC only).

If unit has the Polarity switch option, the Negative (–) weld output terminals are labeled Work receptacles and the CC weld output terminals are labeled Electrode receptacles.

## 5-10. Making Dual Operator CC Weld Connections w/ Separate Work Cables

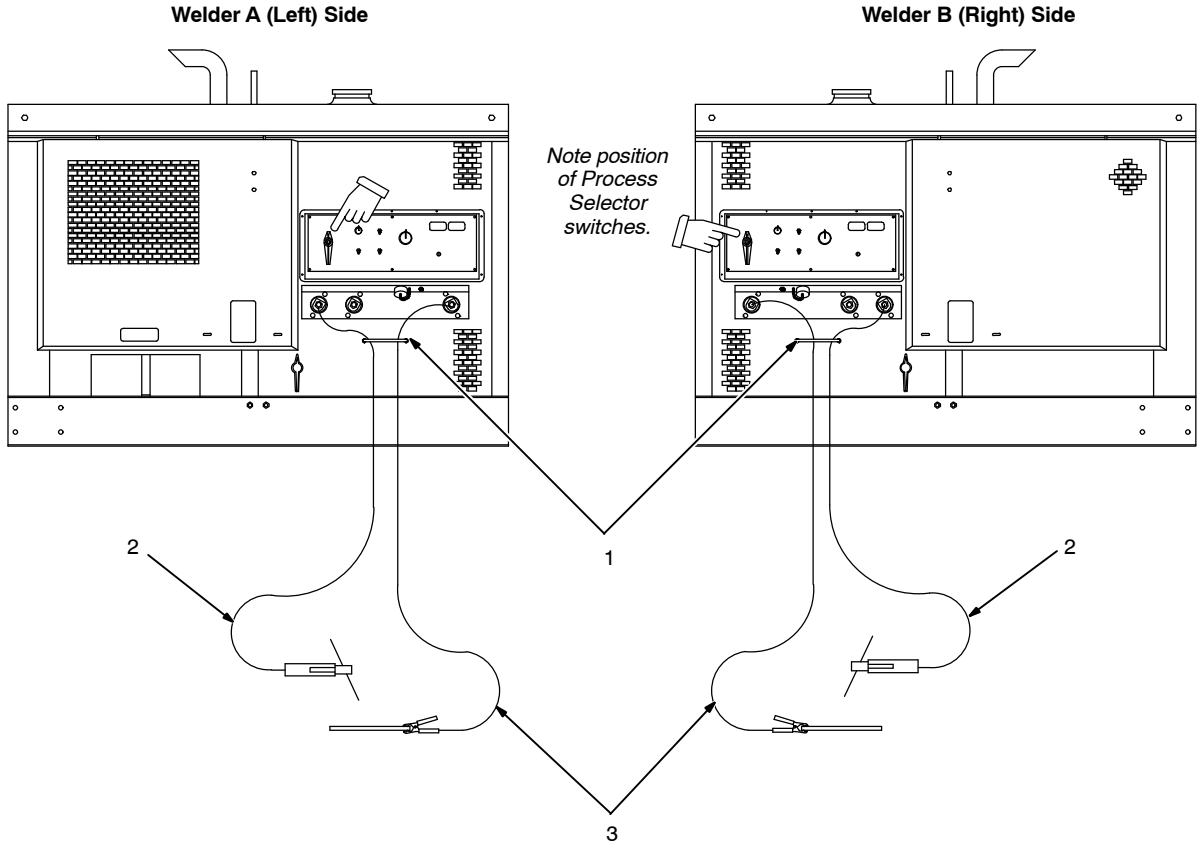



Tools Needed:

3/4 in

☞ *Direct Current Electrode Positive (DCEP) connections are shown.*




Ref. 225 543 / 802 292-A

⚠ **Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

See Section 5-17 for proper cable size.

1 Strain Reliefs

Route cables through strain reliefs.

2 Electrode Holder Cables

3 Work Cables

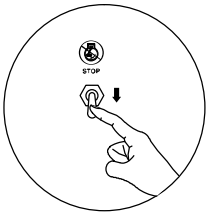
For Stick/TIG welding Direct Current Electrode Positive (DCEP), connect work cables to Negative (–) terminals and electrode holder cables to CC terminals.

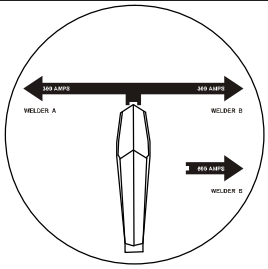
For Stick/TIG Direct Current Electrode Negative (DCEN), connect work cables to CC terminals and electrode holder cables to Negative (–) terminals.

If unit has the Polarity switch option, connect work cables to Work receptacles and electrode holder cables to Electrode receptacles.

☞ *Be sure Process Selector switches are set correctly. See Section 6-3.*

## 5-11. Making Dual Operator Mode CC Weld Connections w/ Common Work Cable



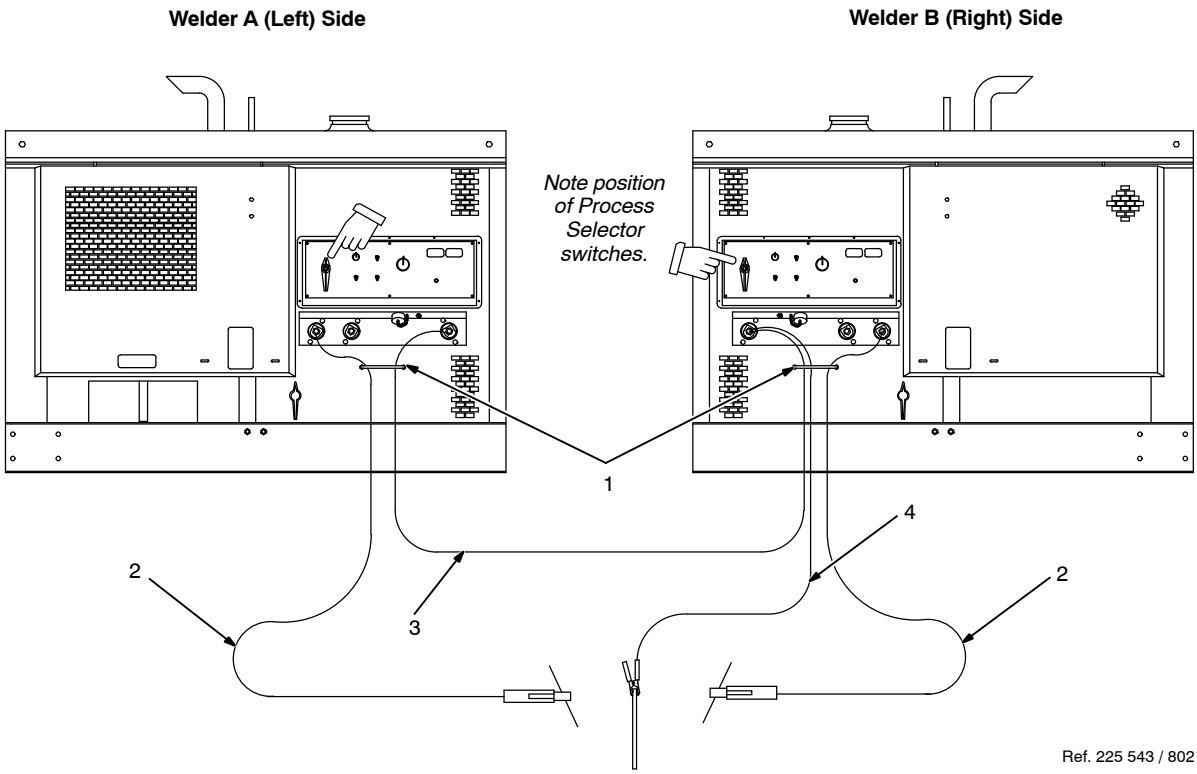

Tools Needed:

3/4 in

**INADEQUATE CABLE CONNECTIONS can cause serious damage to welding generator and create a hazardous condition.**

- When making weld connections with a common work cable, connect a weld cable of adequate size between the Negative (–) weld terminals, and connect a single weld cable of adequate size from the Welder B (right) Negative (–) terminal to the workpiece.
- When using these connections as a common work terminal, all connections must be of the same polarity.
- For a common work cable connection, the work cable must be able to carry the combined weld output of both modules (see Section 5-17 for proper cable size).

☞ *Direct Current Electrode Positive (DCEP) connections are shown.*




Ref. 225 543 / 802 292-A

**Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *For common work connection, work cable must be able to carry combined weld output of both CC weld output terminals (see Section 5-17 for proper cable size).*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

1 Strain Relief

Route cables through strain reliefs.

2 Electrode Holder Cables

3 Work Jumper Cable

4 Common Work Cable

For Stick/TIG welding Direct Current Electrode Positive (DCEP), connect common work cable and work jumper cable to Welder B (right) Negative (–) terminal. Connect other end of work jumper cable to Welder A (left) Negative (–) terminal.

Connect electrode holder cables to CC terminals.

For Stick/TIG Direct Current Electrode Negative (DCEN), connect common work cable and work jumper cable to Welder B (right) CC terminal. Connect other end of work jumper cable to Welder A (left) CC terminal.

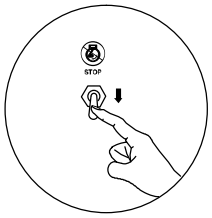
Connect electrode holder cables to Negative (–) terminals.

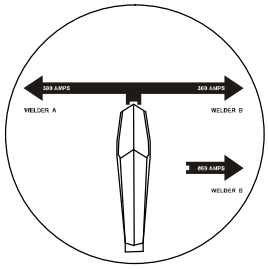
If unit has the Polarity switch option, connect common work cable and work jumper cable to Welder B (right) Work receptacle. Connect other end of work jumper cable to Welder A (left) Work receptacle.

Connect electrode holder cables to Electrode receptacles.

☞ *Be sure Process Selector switches and optional Polarity switches are set correctly. See Section 6-3.*

## 5-12. Making Dual Operator CV Weld Connections w/ Separate Work Cables

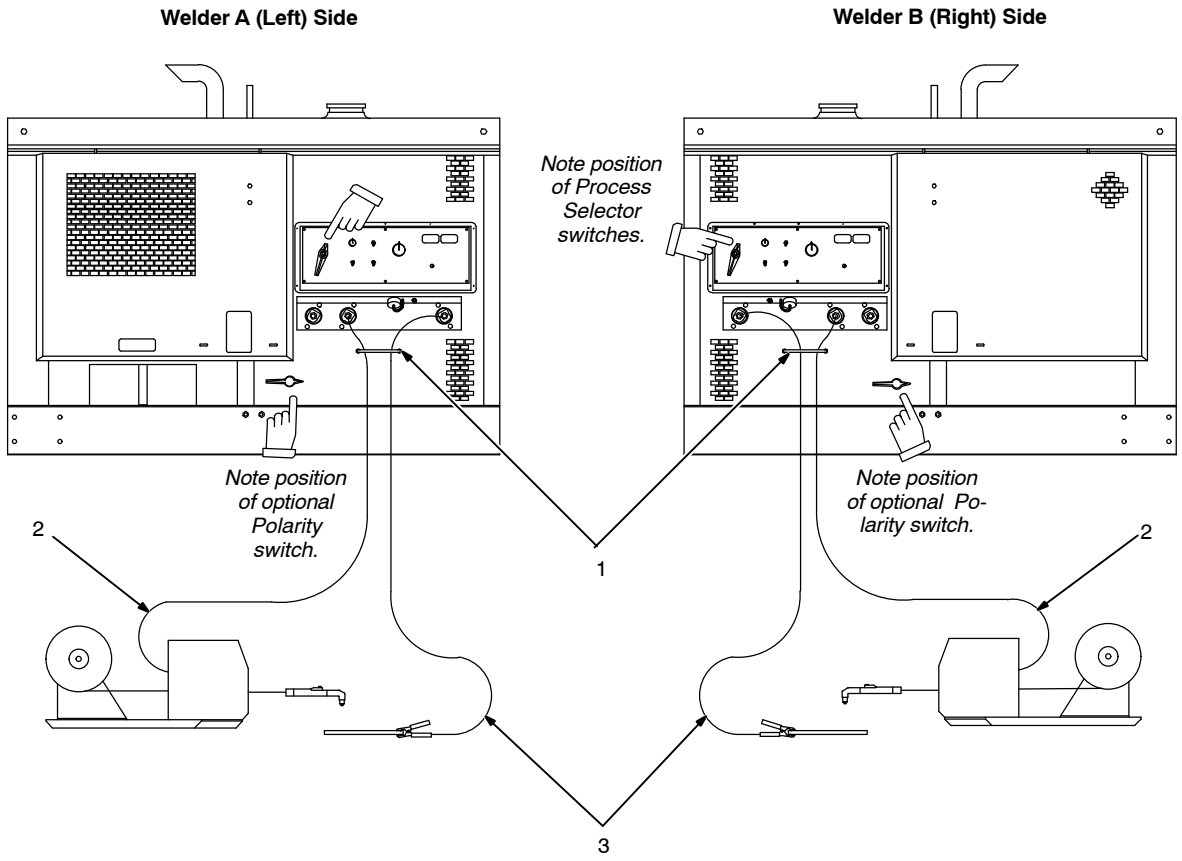



Tools Needed:

3/4 in

*Direct Current Electrode Positive (DCEP) connections are shown.*




Ref. 225 543 / 802 292-A

**Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

See Section 5-17 for proper cable size.

1 Strain Reliefs

Route cables through strain reliefs.

2 Wire Feeder Cables

3 Work Cables

For MIG and FCAW welding Direct Current Electrode Positive (DCEP), connect work cables to Negative (–) terminals and wire feeder cables to CV terminals.

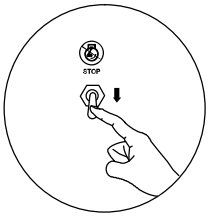
For MIG and FCAW Direct Current Electrode Negative (DCEN), connect work cables to CV terminals and wire feeder cables to Negative (–) terminals.

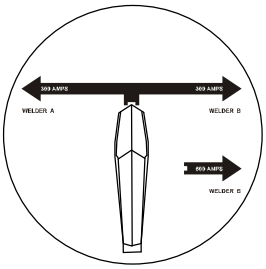
If unit has the Polarity switch option, connect work cables to Work receptacles and wire feeder cables to CV receptacles.

☞ *Place optional Polarity switches in Reverse position when using CV weld receptacles. There is no CV weld output when switch is in Straight position.*

☞ *Be sure Process Selector and Polarity switches are set correctly. See Section 6-3.*

## 5-13. Making Dual Operator CV Weld Connections w/ Common Work Cable



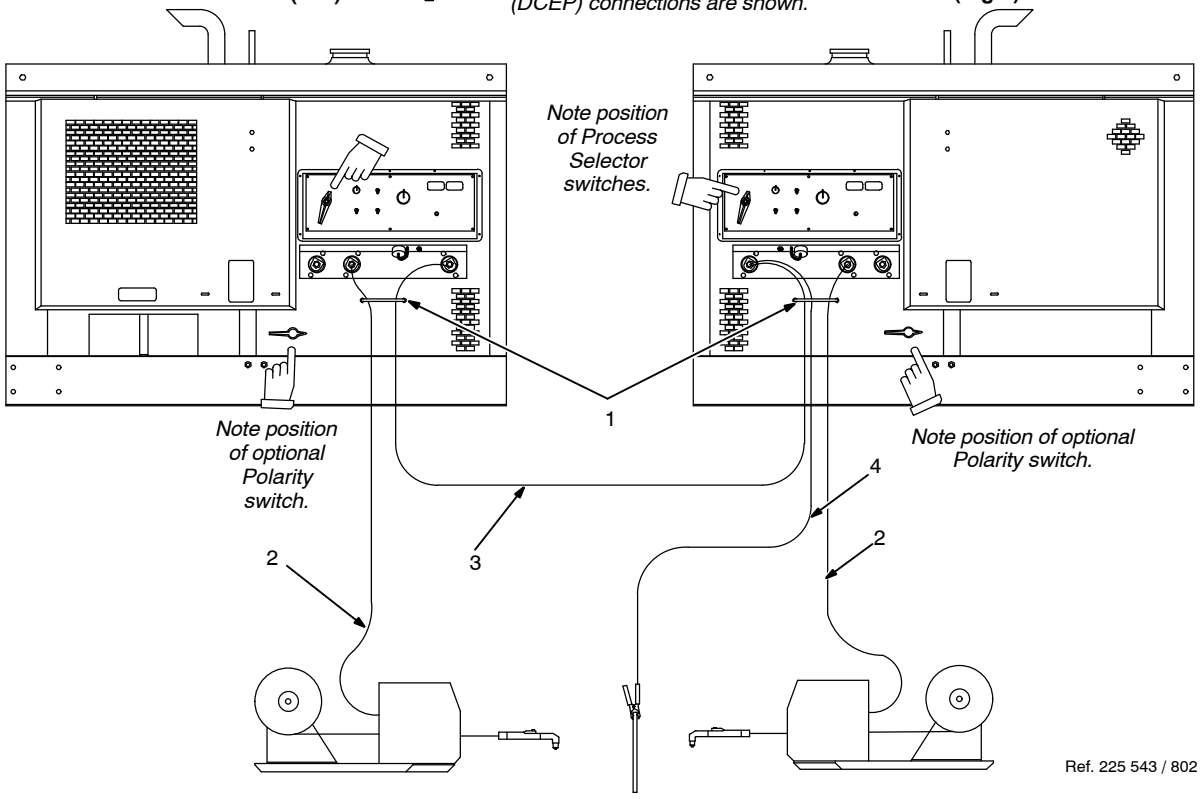




Tools Needed:

3/4 in

**INADEQUATE CABLE CONNECTIONS can cause serious damage to welding generator and create a hazardous condition.**

- When making weld connections with a common work cable, connect a weld cable of adequate size between the Negative (–) weld terminals, and connect a single weld cable of adequate size from the Welder B (right) Negative (–) terminal to the workpiece.
- When using these connections as a common work terminal, all connections must be of the same polarity.
- For a common work cable connection, the work cable must be able to carry the combined weld output of both modules (see Section 5-17 for proper cable size).




Ref. 225 543 / 802 292-A

**Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *For common work connection, work cable must be able to carry combined weld output of both CC weld output terminals (see Section 5-17 for proper cable size).*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

1 Strain Relief

Route cables through strain reliefs.

2 Wire Feeder Cables

3 Work Jumper Cable

4 Common Work Cable

For MIG and FCAW welding Direct Current Electrode Positive (DCEP), connect common work cable and work jumper cable to Welder B (right) Negative (–) terminal. Connect other end of work jumper cable to Welder A (left) Negative (–) terminal.

Connect wire feeder cables to CV terminals.

For MIG and FCAW Direct Current Electrode Negative (DCEN), connect common work cable and work jumper cable to Welder B (right) CV terminal. Connect other end of work jumper cable to Welder A (left) CV terminal.

Connect wire feeder cables to Negative (–) terminals.

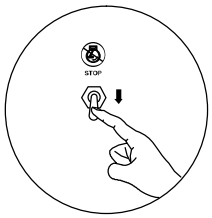
If unit has the Polarity switch option, connect common work cable and work jumper cable to Welder B (right) Work receptacle. Connect other end of work jumper cable to Welder A (left) Work receptacle.

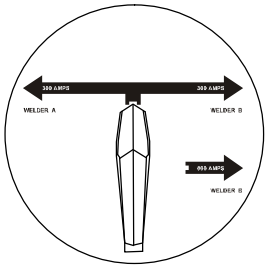
Connect wire feeder cables to CV receptacles.

☞ *Place optional Polarity switches in Reverse position when using CV weld receptacles. There is no CV weld output when switch is in Straight position.*

☞ *Be sure Process Selector and Polarity switches are set correctly. See Section 6-3.*

## 5-14. Making Dual Operator CC And CV Weld Connections w/ Separate Work Cables



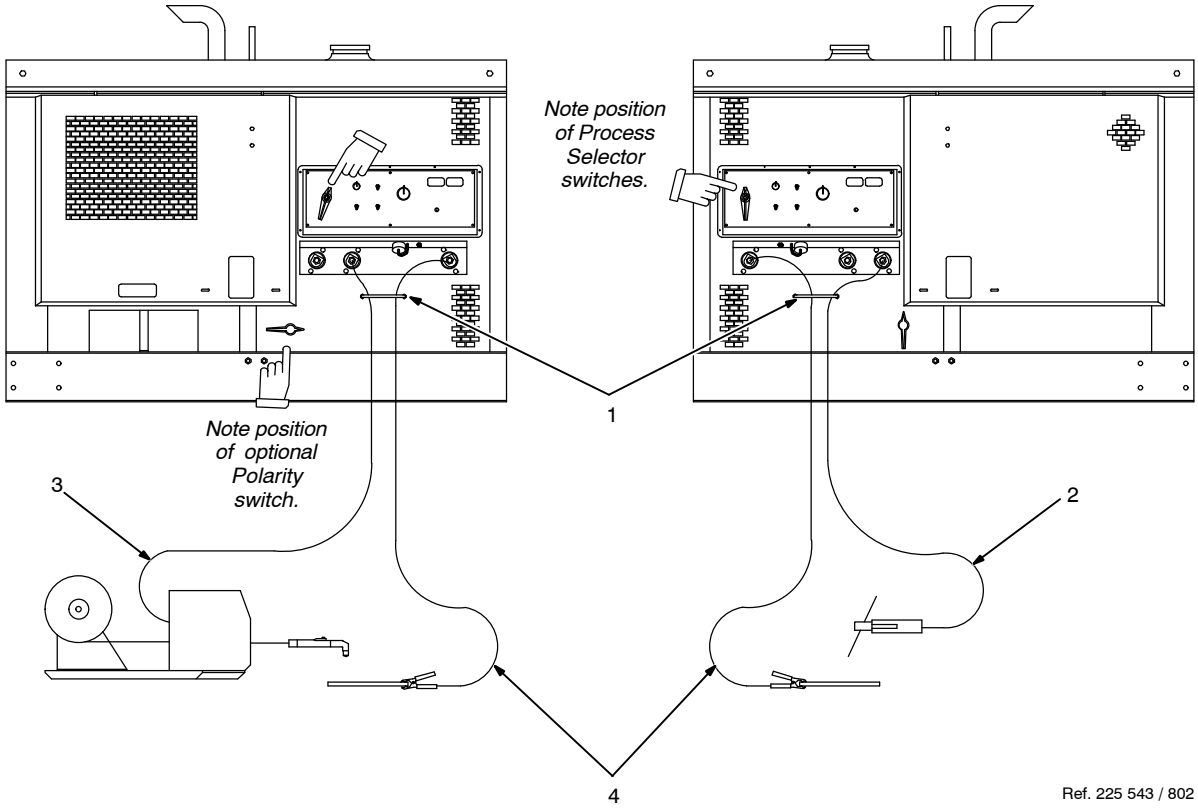




Tools Needed:

3/4 in

☞ *Direct Current Electrode Positive (DCEP) connections are shown.*

**Welder A (Left) Side** **Welder B (Right) Side**




Ref. 225 543 / 802 292-A

⚠ **Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

See Section 5-17 for proper cable size.

1 Strain Reliefs

Route cables through strain reliefs.

2 Electrode Holder Cable

3 Wire Feeder Cable

4 Work Cables

For Stick/TIG welding Direct Current Electrode Positive (DCEP), connect work cable to Negative (–) terminal and electrode holder cable to CC terminal.

For Stick/TIG Direct Current Electrode Negative (DCEN), connect work cable to CC terminal and electrode holder cable to Negative (–) terminal.

☞ *Be sure Process Selector switches are set correctly. See Section 6-3.*

For MIG and FCAW welding Direct Current Electrode Positive (DCEP), connect work cable to Negative (–) terminal and wire feeder cable to CV terminal.

For MIG and FCAW Direct Current Electrode Negative (DCEN), connect work cable to CV terminal and wire feeder cable to Negative (–) terminal.

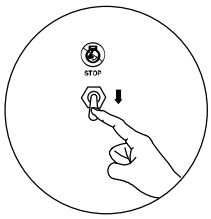
For Stick/TIG welding on units with Polarity switch option, connect work cable to Work receptacle and electrode cable to Electrode receptacle.

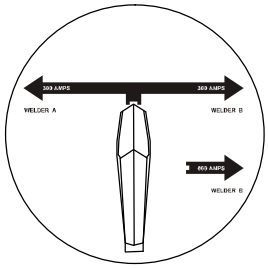
For MIG/FCAW welding on units with Polarity switch option, connect work cable to Work receptacle and wire feeder cable to CV receptacle.

☞ *Place optional Polarity switches in Reverse position when using CV weld receptacles. There is no CV weld output when switch is in Straight position.*

☞ *Be sure Process Selector and Polarity switches are set correctly. See Section 6-3.*

## 5-15. Making Dual Operator CC And CV Weld Connections w/ Common Work Cable



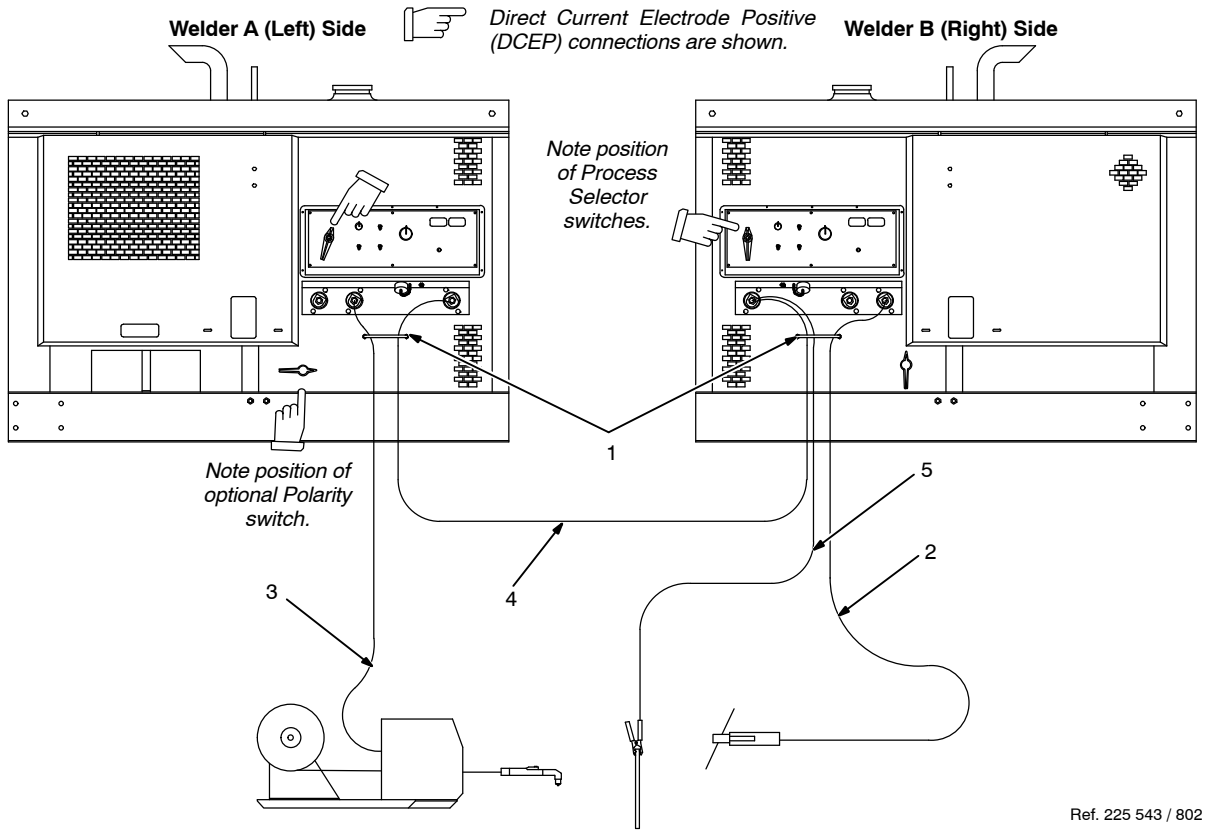




Tools Needed:

3/4 in

**INADEQUATE CABLE CONNECTIONS can cause serious damage to welding generator and create a hazardous condition.**

- When making weld connections with a common work cable, connect a weld cable of adequate size between the Negative (–) weld terminals, and connect a single weld cable of adequate size from the Welder B (right) Negative (–) terminal to the workpiece.
- When using these connections as a common work terminal, all connections must be of the same polarity.
- For a common work cable connection, the work cable must be able to carry the combined weld output of both modules (see Section 5-17 for proper cable size).




Ref. 225 543 / 802 292-A

**Stop engine.**

***NOTICE*** *– Do not exceed machine duty cycle.*

☞ *For common work connection, work cable must be able to carry combined weld output of both CC weld output terminals (see Section 5-17 for proper cable size).*

☞ *Use Dual Operator mode for CC and CV welding (see Section 6-1).*

1 Strain Reliefs

Route cables through strain reliefs.

2 Electrode Holder Cable

3 Wire Feeder Cable

4 Work Jumper Cable

5 Common Work Cable

For Direct Current Electrode Positive (DCEP), connect common work cable and work jumper cable to Welder B (right) Negative (–) terminal. Connect other end of work jumper cable to Welder A (left) Negative (–) terminal.

Connect electrode holder cable to either CC terminal.

Connect wire feeder cable to CV terminal on other side.

☞ *Be sure Process Selector switches are set correctly. See Section 6-3.*

For Direct Current Electrode Negative (DCEN), connect common work cable and work jumper cable to Welder B (right) CC terminal. Connect other end of work jumper cable to Welder A (left) CV terminal.

Connect electrode holder cable to either Negative (–) terminal, and wire feeder cable to remaining Negative (–) terminal.

If unit has the Polarity switch option, connect common work cable and work jumper cable to Welder B (right) Work receptacle. Connect other end of work jumper cable to Welder A (left) Work receptacle.

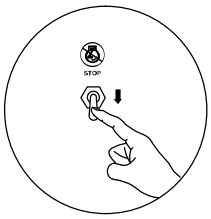
Connect electrode holder cable to either Electrode receptacle.

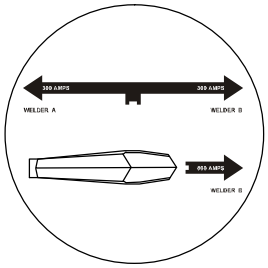
Connect wire feeder cable to CV receptacle on other side.

☞ *Place optional Polarity switch in Reverse position when using CV weld receptacle. There is no CV weld output when switch is in Straight position.*

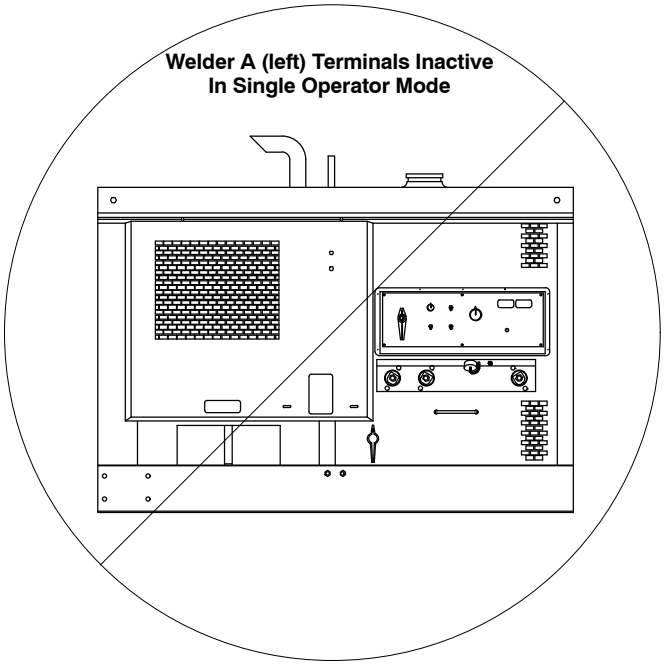
☞ *Be sure Process Selector and Polarity switches are set correctly. See Section 6-3.*

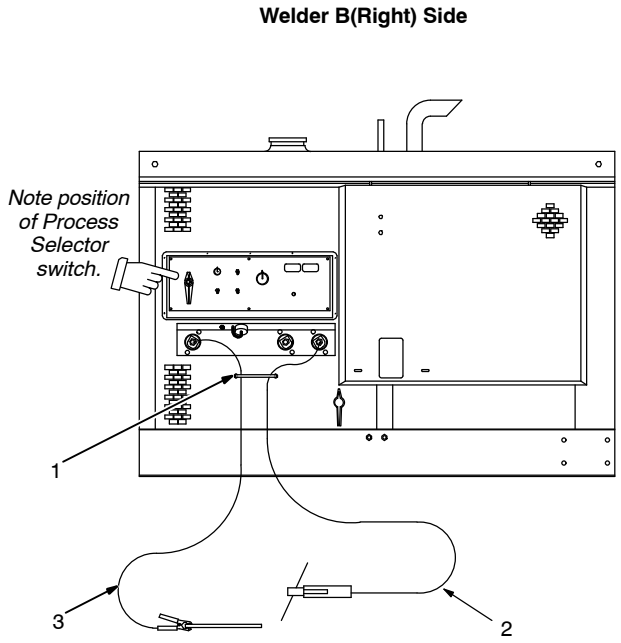
## 5-16. Making Single Operator CC Weld Connections




☞ *Direct Current Electrode Positive (DCEP) connections are shown.*




Tools Needed:

3/4 in

Ref. 225 543 / 802 292-A

**Stop engine.**

***NOTICE*** – *Do not exceed machine duty cycle.*

☞ *Welder A (left) weld output terminals are disabled in Single Operator mode. Connect only to Welder B (right) terminals for Single Operator mode operation.*

☞ *Use Single Operator mode for CC welding only. Welder A and Welder B CV weld output terminals are disabled in Single Operator mode. (see Section 5-10).*

☞ *See Section 5-17 for proper cable size.*

See Section 5-17 for proper cable size.

1 Strain Relief

Route cables through strain reliefs.

2 Electrode Holder Cable

3 Work Cable

For Stick/TIG welding Direct Current Electrode Positive (DCEP), connect work cable to Negative (–) terminal and electrode holder cable to CC terminal.

For Stick/TIG Direct Current Electrode Negative (DCEN), connect work cable to CC terminal and electrode holder cable to Negative (–) receptacle.

If unit has the Polarity switch option, connect work cable to Work terminal and electrode holder cable to Electrode receptacle.

☞ *Be sure Process Selector switch is set correctly. See Section 6-3.*

## 5-17. Selecting Weld Cable Sizes*

***NOTICE*** *– The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 100 ft (30 m) from the workpiece, the total cable length in the weld circuit is 200 ft (2 cables x 100 ft). Use the 200 ft (60 m) column to determine cable size.*

| **Weld Output Terminals** ⚠ **Turn off power before connecting to weld output terminals.** ⚠ **Do not use worn, damaged, undersized, or poorly spliced cables.** | **Welding Amperes** | **Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding*** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **100 ft (30 m) or Less** | | **150 ft (45 m)** | **200 ft (60 m)** | **250 ft (70 m)** | **300 ft (90 m)** | **350 ft (105 m)** | **400 ft (120 m)** |
| | | **10 – 60% Duty Cycle** | **60 – 100% Duty Cycle** | **10 – 100% Duty Cycle** | | | | | |
| | 100 | 4 (20) | 4 (20) | 4 (20) | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 1/0 (60) |
| | 150 | 3 (30) | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 3/0 (95) |
| | 200 | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 4/0 (120) |
| | 250 | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 2/0 (2x70) |
| | 300 | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 3/0 (2x95) |
| | 350 | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) |
| | 400 | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 2 ea. 4/0 (2x120) |
| | 500 | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 3 ea. 3/0 (3x95) | 3 ea. 3/0 (3x95) |
| | 600 | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 3 ea. 3/0 (3x95) | 3 ea. 4/0 (3x120) | 3 ea. 4/0 (3x120) |
| | 700 | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 3 ea. 3/0 (3x95) | 3 ea. 4/0 (3x120) | 3 ea. 4/0 (3x120) | 4 ea. 4/0 (4x120) |
| | 800 | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 3 ea. 4/0 (3x120) | 3 ea. 4/0 (3x120) | 4 ea. 4/0 (4x120) | 4 ea. 4/0 (4x120) |

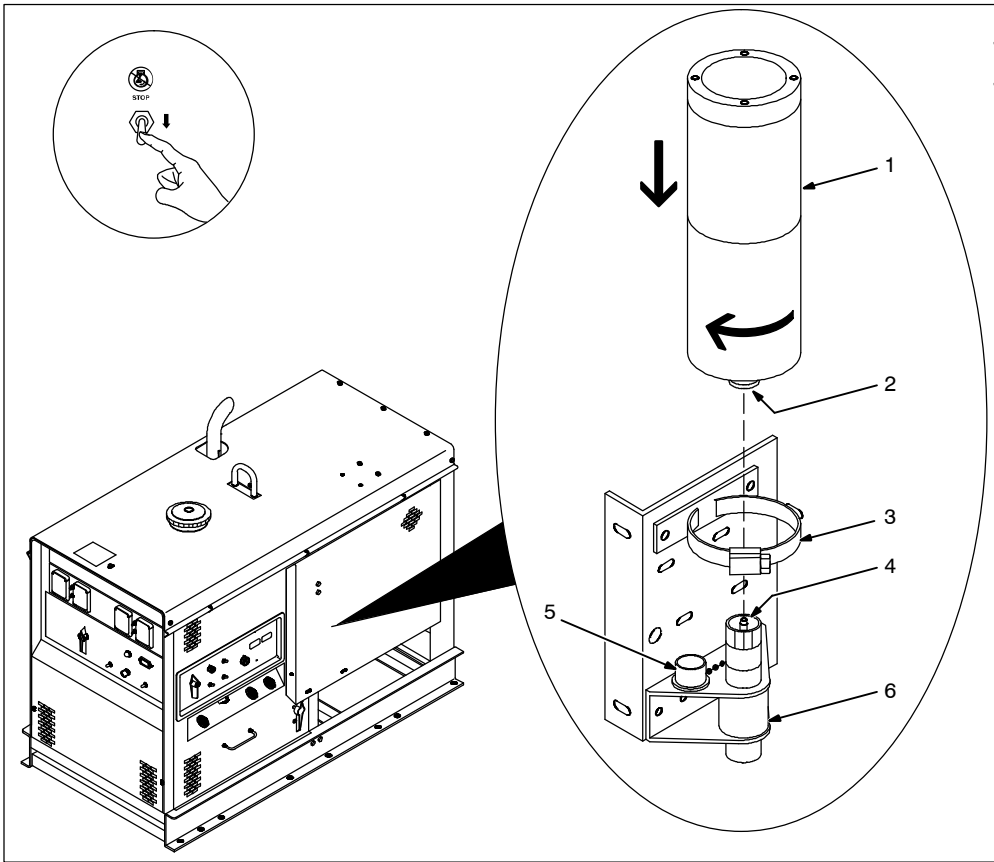
* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
( ) = $mm^2$ for metric use

***For distances longer than those shown in this guide, call a factory applications rep. at 920-735-4505 (Miller) or 1-800-332-3281 (Hobart)

Ref. S-0007-G 2009–08

## 5-18. Installing Ether Cylinder (Optional Ether Starting Aid)




**Stop engine.**

**Improper handling or exposure to ether can harm your health. Follow manufacturer's safety instructions on cylinder.**

**Do not use Ether Starting Aid while engine is running.**

Open right side door.

1 Ether Cylinder

2 Nozzle

Remove cover and clean cylinder nozzle.

3 Clamp

4 Fitting

5 Cap

6 Valve

Remove cap and clean fitting. Install cylinder on fitting. Tighten clamp.

☞ *After installing cylinder, wait at least 10 minutes before using to let ether particles settle and prevent atomizer plugging.*

Put cap on fitting when cylinder is removed.

ether1 7/96 – 153 382-A / 225 543 / 804 289-A

## 5-19. Remote 14 Receptacle Information

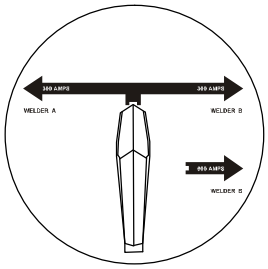
☞ *Place Welder Selector switch in Welder A/Welder B position (dual operator mode) for both remote receptacles to work. Welder A (left) remote receptacle output contactor and control is disabled when switch is in Welder B position.*

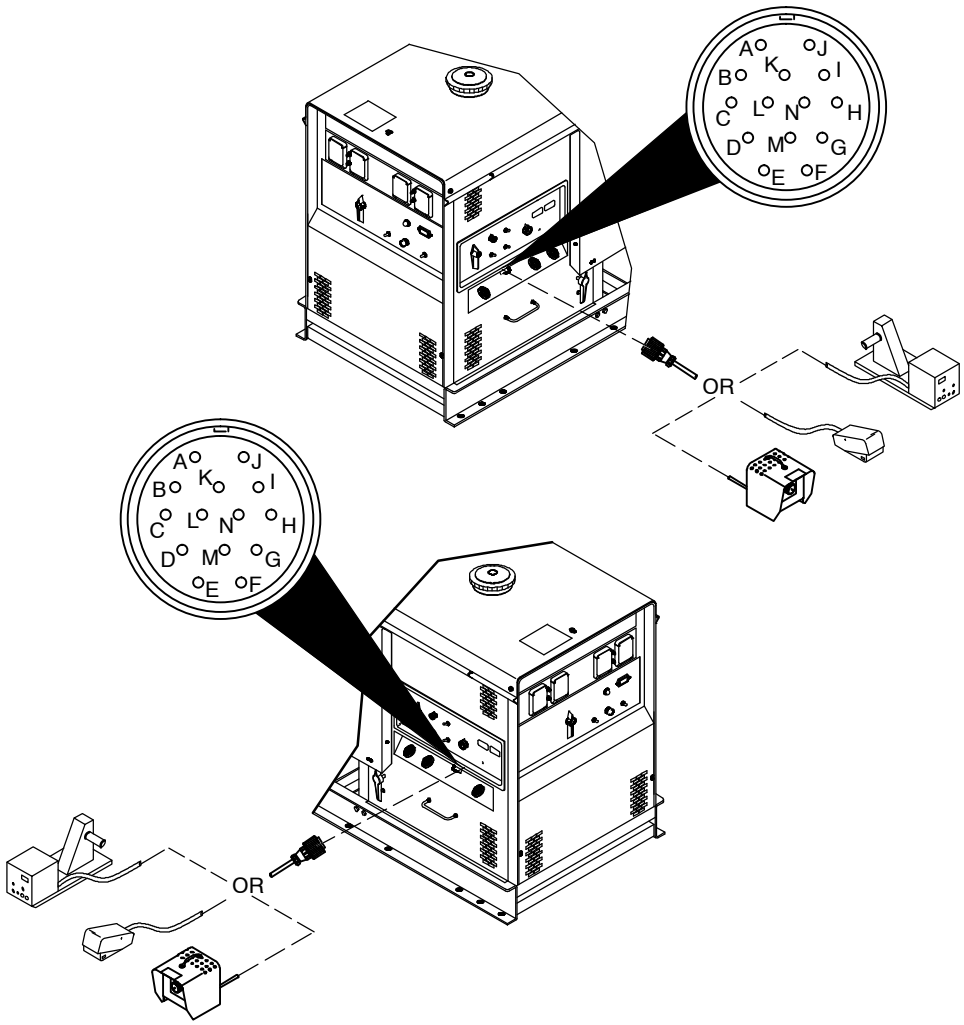
| REMOTE 14 | Socket* | Socket Information |
|---|---|---|
| **24 VOLTS AC OUTPUT (CONTACTOR)** | A | 24 volts AC. Protected by supplementary protectors CB5 and CB6. |
| | B | Contact closure to A completes 24 volts AC contactor control circuit. |
| **REMOTE OUTPUT CONTROL** | C | Output to remote control; +10 volts DC in CV, 0 to +10 volts DC in CC. |
| | D | Remote control circuit common. |
| | E | 0 to +10 volts DC input command signal from remote control. |
| **A/V AMPERAGE VOLTAGE** | F | Current feedback; 0 to +10 volts dc, 1 volt per 100 amperes. |
| | H | Voltage feedback; +1 volts DC per 10 arc volts. |
| **115 VOLTS AC OUTPUT (CONTACTOR)** | I | 115 volts, 15 amperes, 60 Hz ac. Protected by supplementary protectors CB5 and CB6. |
| | J | Contact closure to I completes 115 volts AC contactor control circuit. |
| **GND** | K | Chassis common. |
| | G | Circuit common for 24 and 115 volts AC circuits. |

*The remaining sockets are not used.

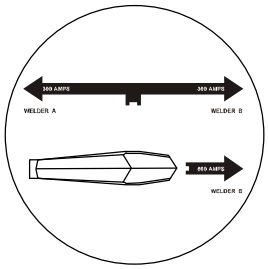
## 5-20. Remote 14 Receptacle Connections

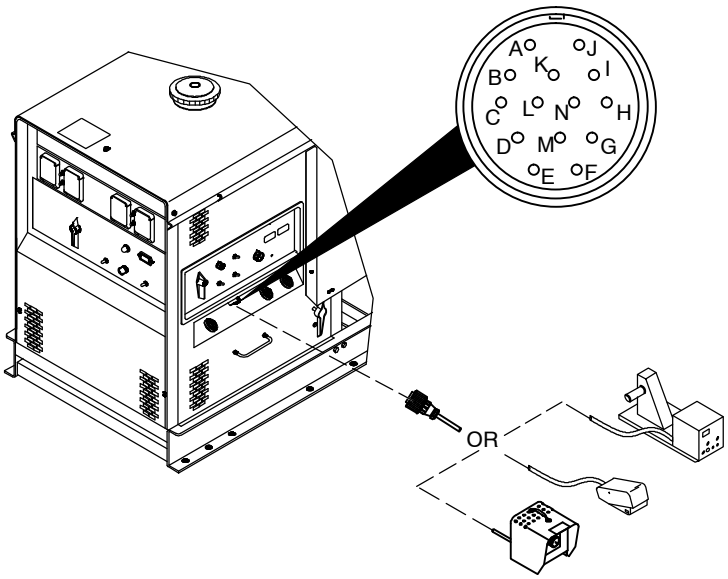
**Dual Operator Operation**




**Single Operator Operation**



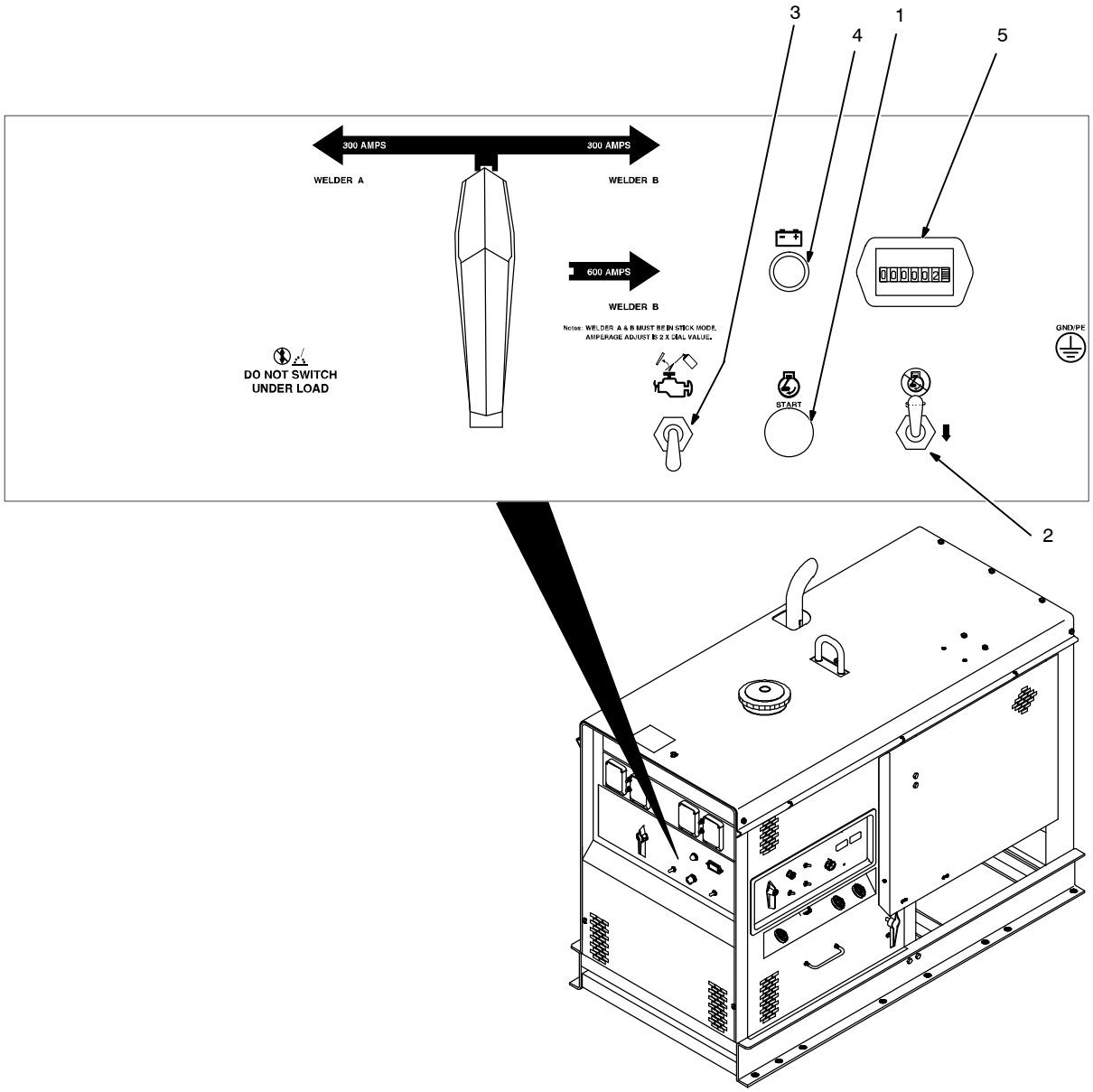




804 289-A / Ref 225 543

# SECTION 6 – OPERATING THE WELDING GENERATOR

☞ *When facing the front panel, the Welder B controls and weld terminals are on the right and the Welder A side controls and weld terminals are on the left.*

## 6-1. Engine Controls




225 543 / 804 289-A

☞ *See Section 6-3 for weld control descriptions.*

1 Engine Start Button

2 Stop Switch

3 Ether Starting Aid Switch (Optional)

Push switch up and release while cranking engine to release ether.

**To Start**: Press button and use Ether switch (if necessary). Release button when engine starts.

☞ *If the engine does not start, let engine come to a complete stop before attempting restart.*

**To Stop**: Push switch down and hold. Release when engine stops.

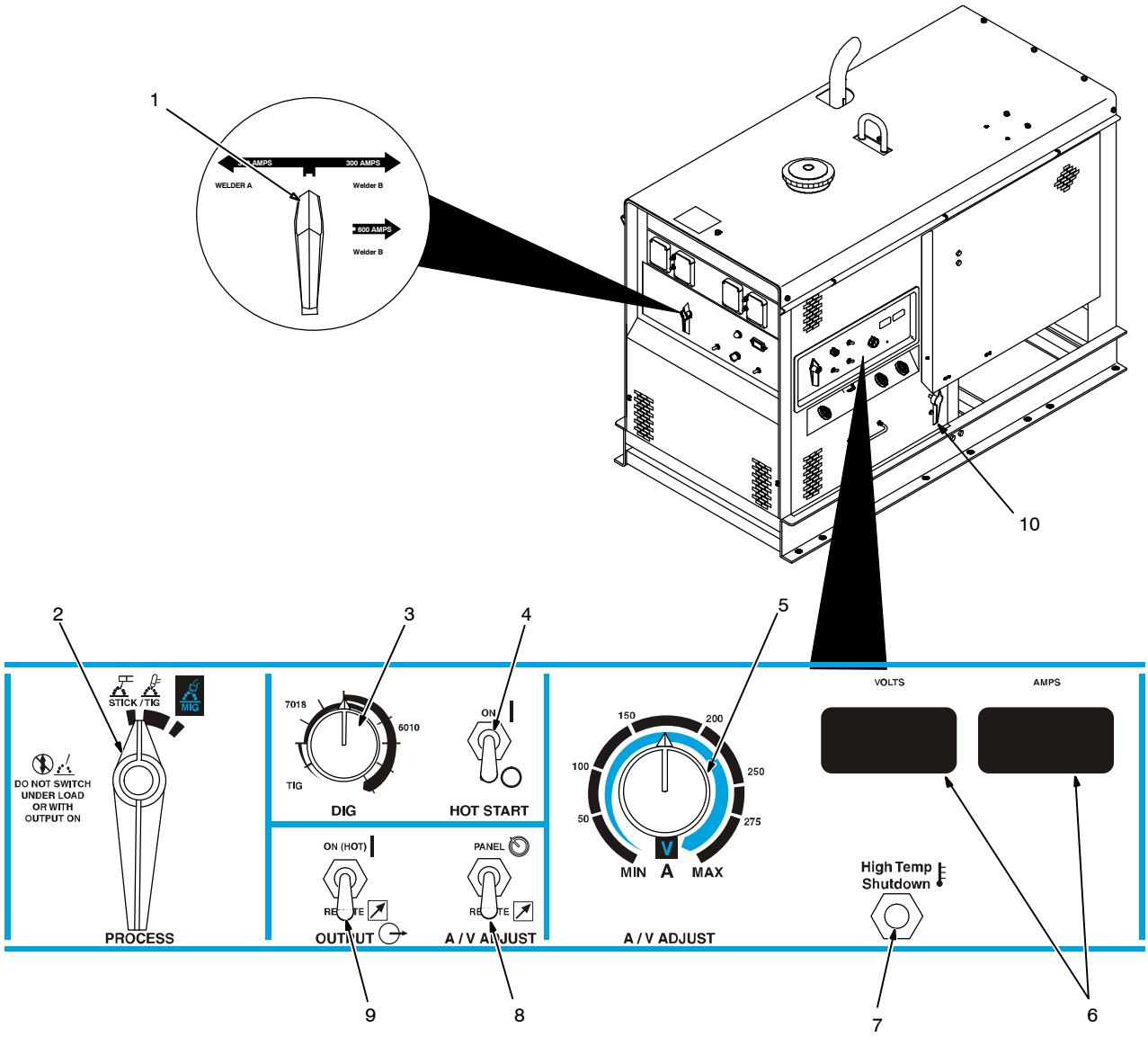
4 Battery Charging Warning Light

Light goes on when battery is not charging.

***NOTICE*** *– If light goes on, stop engine and check alternator and engine belt.*

5 Engine Hour Meter

## 6-2. Weld Controls (See Section 6-3)




Ref. 225 543 / 191 848 / 804 289-A

## 6-3. Weld Control Descriptions (See Section 6-2)

1 Welder Selector Switch

Use switch to select Dual Operator or Single Operator welding mode.

Place switch in Welder A/Welder B (dual operator) position for CC and CV output from Welder A (left) and Welder B (right) weld output terminals. Control the weld output from the terminals on each side using the weld controls on that same side.

Place switch in Welder B (single operator) position for CC weld output from Welder B (right) weld output terminals only. CV weld output terminals on both sides do not work when unit is in Single Operator mode.

☞ *Welder A (left) weld output terminals are disabled in Single Operator mode. Connect only to Welder B (right) terminals for Single Operator operation.*

☞ *When in single Operator mode, only CC weld output is available. Welder A (left) and Welder B (right) side CV weld output terminals are disabled in Single Operator mode. (see Section 5-10).*

2 Process Selector Switch

Use switch to select output for weld process. If switch is in Stick/Tig position, place Welder Selector switch in Welder A/Welder B or Welder B Position. If switch is in MIG position, place Welder Selector switch in Welder A/Welder B position only.

☞ *CV weld output for MIG is only available when Welder Selector switch is in Welder A/Welder B position.* ***All weld output stops if either Process Selector switch is placed in MIG position when Welder Selector switch is in Welder B position.***

☞ *Place optional Polarity switch in Reverse position when using CV weld output. There is no CV weld output when Polarity switch is in Straight position.*

***NOTICE*** *– Do not switch under load or with output on.*

3 Arc Force (Dig) Control

Use control to automatically increase amperage as arc length is decreased to assist in arc starts and reduce the chance of the electrode sticking in the puddle. Turn clockwise to increase short-circuit amperage. Set at minimum for TIG welding.

4 Hot Start Switch

Use switch to disable hot start circuit. Turn switch On for Stick (SMAW) and Submerged Arc (SAW) Welding, and Air Carbon Arc Cutting and Gouging (CAC-A). Turn switch Off for TIG (GTAW) welding.

When switch is in On position, higher short-circuit amperage helps arc starting. After arc starts, the front panel or remote Amperage/Voltage control setting determines weld amperage.

☞ *The hot start circuit does not function when constant voltage (CV) welding.*

5 Amperage/Voltage Control

When Process Selector switch is in the Stick/TIG position, turn control clockwise to increase amperage. Read amperage from outer scale of control. The Amperage/Voltage control adjusts amperage only when constant current (CC) welding and does not adjust open-circuit voltage.

When Process Selector switch is in the MIG position, turn control clockwise to increase voltage. Voltmeter value changes as control knob is turned. Control can be adjusted while welding.

☞ *When Welder Selector switch is in Welder B position (single operator mode), weld amperage is two times the value selected by the Amperage/Voltage control. For example, if Amperage/Voltage control is set to 250 A, weld output is actually 500A.*

6 Weld Meters

With Process Selector switch in the Stick/Tig position, meters read 0 (zero) with contactor off. Meters display actual output voltage and amperage with contactor on.

With Process Selector switch in the MIG position, voltmeter displays preset voltage with contactor off. Voltmeter and ammeter display actual output voltage and amperage with contactor on.

7 High Temperature Shutdown Light

Light goes on and weld output stops if weld rectifier gets too warm. Let unit cool before welding.

8 Remote Amperage/Voltage Control Switch

For front panel control, place switch in Panel position. For remote control, place switch in Remote position, and connect remote device (see Section 5-19).

9 Output (Contactor) Switch

For front panel control of output, place switch in On (Hot) position. For remote control of output, place switch in Remote position, and connect remote device (see Section 5-19).

⚠ **Weld output terminals are energized when Output (Contactor) switch is On and engine is running.**

10 Polarity Switch (Optional)

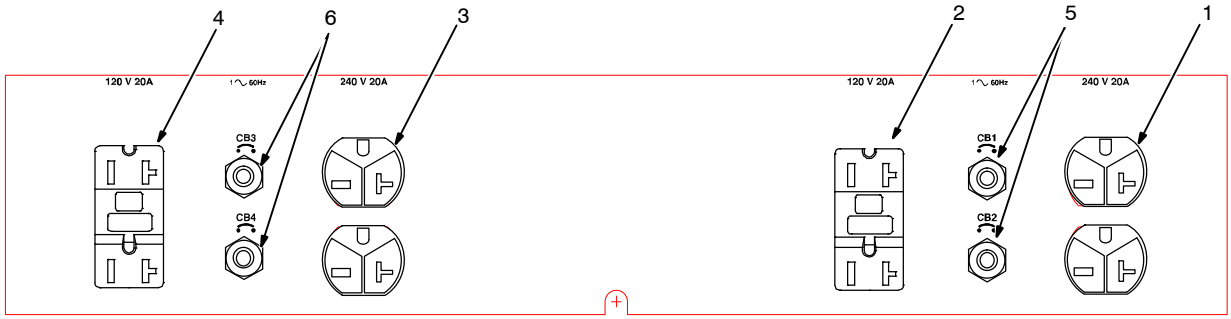
***NOTICE*** *– Do not switch under load.*

Use switch to change polarity of weld output (see Sections 5-9 thru 5-16).

☞ *Place optional Polarity switch in Reverse position when using CV weld receptacle. There is no CV weld output when switch is in Straight position.*

# SECTION 7 – OPERATING AUXILIARY EQUIPMENT

## 7-1. 120 Volt And 240 Volt Duplex Receptacles




190 376

**Be sure equipment connected to the 240 V receptacles is GFCI-protected.**

☞ *Generator power is not affected by position of Welder Selector switch.*

☞ *4 kVA/kW generator power output is shared by all receptacles.*

1 240 V 20 A AC Receptacle RC1

2 120 V 20 A AC GFCI Receptacle GFCI 1

3 240 V 20 A AC Receptacle RC2

4 120 V 20 A AC GFCI Receptacle GFCI 2

Receptacles supply 60 Hz single-phase power at weld/power speed.

If a ground fault is detected, the GFCI receptacle(s) circuit opens to disconnect the faulty equipment and the GFCI Reset button pops out. Check for damaged tools, cords, plugs, etc. connected to the receptacle. Press button to reset receptacle and resume operation.

☞ *At least once a month, run engine at weld/power speed and press Test button to verify GFCI is working properly.*

5 Supplementary Protectors CB1 And CB2

6 Supplementary Protectors CB3 And CB4

CB1 and CB2 protect RC1 and GFCI 1 from overload. If CB1 or CB2 opens, RC1 does not work. 120 volts may still be present at RC1. If CB2 opens, GFCI 1 does not work. Press button to reset.

CB3 and CB4 protect RC2 and GFCI 2 from overload. If CB3 or CB4 opens, RC2 does not work. 120 volts may still be present at RC2. If CB4 opens, GFCI 2 does not work. Press button to reset.

☞ *If a supplementary protector continues to open, contact Factory Authorized Service Agent.*

Maximum output from each 120 volt GFCI receptacle is 2.4 kVA/kW. Maximum output from each 240 volt duplex receptacle half is 4.0 kVA/kW.

Total combined output from all receptacles is 4 kVA/kW.

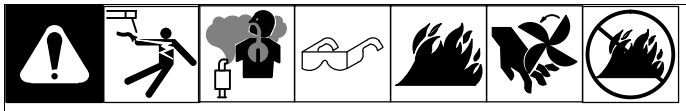
EXAMPLE: If 12 A is drawn from RC1, only 9 A is available at GFCI 1:

(240 V x 12 A) + (120 V x 9 A) = 4.0 kVA/kW

☞ *Generator power is not affected by weld output.*

# SECTION 8 – MAINTENANCE & TROUBLESHOOTING

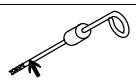
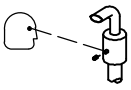
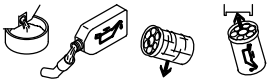
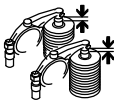
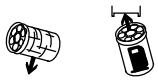
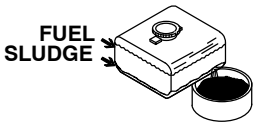
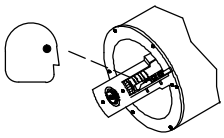
## 8-1. Routine Maintenance



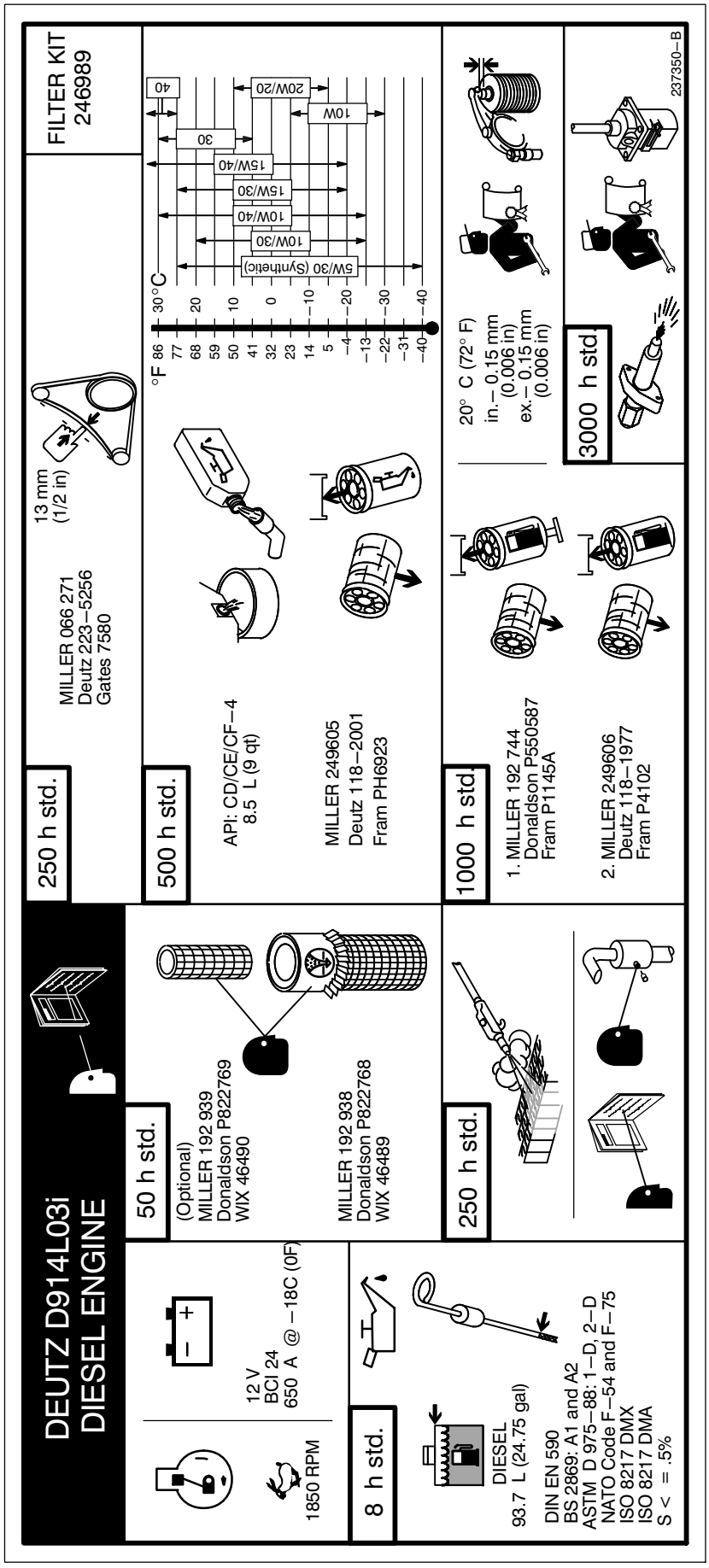
Recycle engine fluids.

**Stop engine before maintaining.**

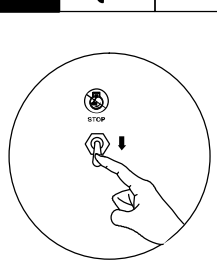
☞ *See Engine Manual and Maintenance Label for important start-up, service, and storage information. Service engine more often if used in severe conditions.*

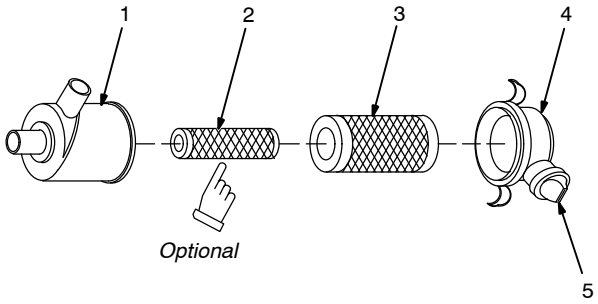
| | ✓ = Check ◇ = Change ● = Clean ☆ = Replace<br>* To be done by Factory Authorized Service Agent | | | | Reference |
|---|---|---|---|---|---|
| Every **8** Hours | <br>✓ Fuel/Water Separator | <br>✓ Fuel Level |  <br>✓ Oil Level | <br>● Oil, Fuel Spills | Section 5-7, 8-4 |
| Every **50** Hours | <br>● Air Cleaner Element | <br>● Weld Terminals | | | Section 8-3 |
| Every **100** Hours | <br>● Battery Terminals | <br>✓ Air Cleaner Hoses | | | |
| Every **250** Hours | <br>☆ Unreadable Labels |  <br>✓●Spark Arrestor | <br>✓ Alternator Belt Tension | | Engine Manual, Section 8-8 |
| Every **500** Hours | <br>✓☆ Weld Cables | ***NOTICE*** *– Change engine oil and filter after initial 50 to 75 hours of use.*<br>  <br>◇ Oil ◇ Oil Filter | | | |
| Every **1000** Hours |  <br>✓Valve Clearance* | <br>● Inside Unit |  <br>◇ Fuel Filter |  <br>● Drain Sludge | Section 8-4, 8-9 and Engine Manual |
| |  <br>✓● Slip Rings*<br>✓☆ Brushes* | | | | |

## 8-2. Maintenance Label



## 8-3. Servicing Air Cleaner






**Stop engine.**

***NOTICE*** *– Do not run engine without air cleaner or with dirty element. Engine damage caused by using a damaged element is not covered by the warranty.*

☞ *The air cleaner primary element can be cleaned but the dirt holding capacity of the filter is reduced with each cleaning. The chance of dirt reaching the clean side of the filter while cleaning and the possibility of filter damage makes cleaning a risk. Consider the risk of unwarrantable equipment damage when determining whether to clean or replace the primary element.*

*If you decide to clean the primary element, we strongly recommend installing an optional safety element to provide additional engine protection.* ***Never clean a safety element.*** *Replace the safety element after servicing the primary element three times.*

Clean or replace primary element if dirty (see note above before cleaning). **Replace** primary element if damaged. Replace primary element yearly or after six cleanings.

1 Housing

2 Safety Element (Optional)

3 Primary Element

4 Dust Cap

5 Dust Ejector

**To clean air filter:**

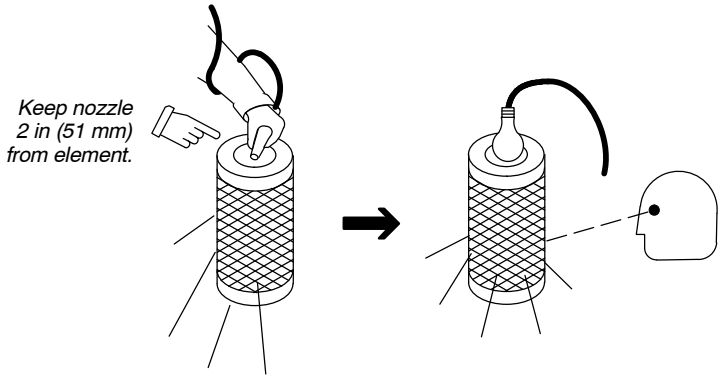
Wipe off cap and housing. Remove cap and dump out dust. Remove element(s). Wipe dust from inside cap and housing with damp cloth. Reinstall safety element (if present). Reinstall cap.

***NOTICE*** *– Do not clean housing with air hose.*

Clean primary element with compressed air only.

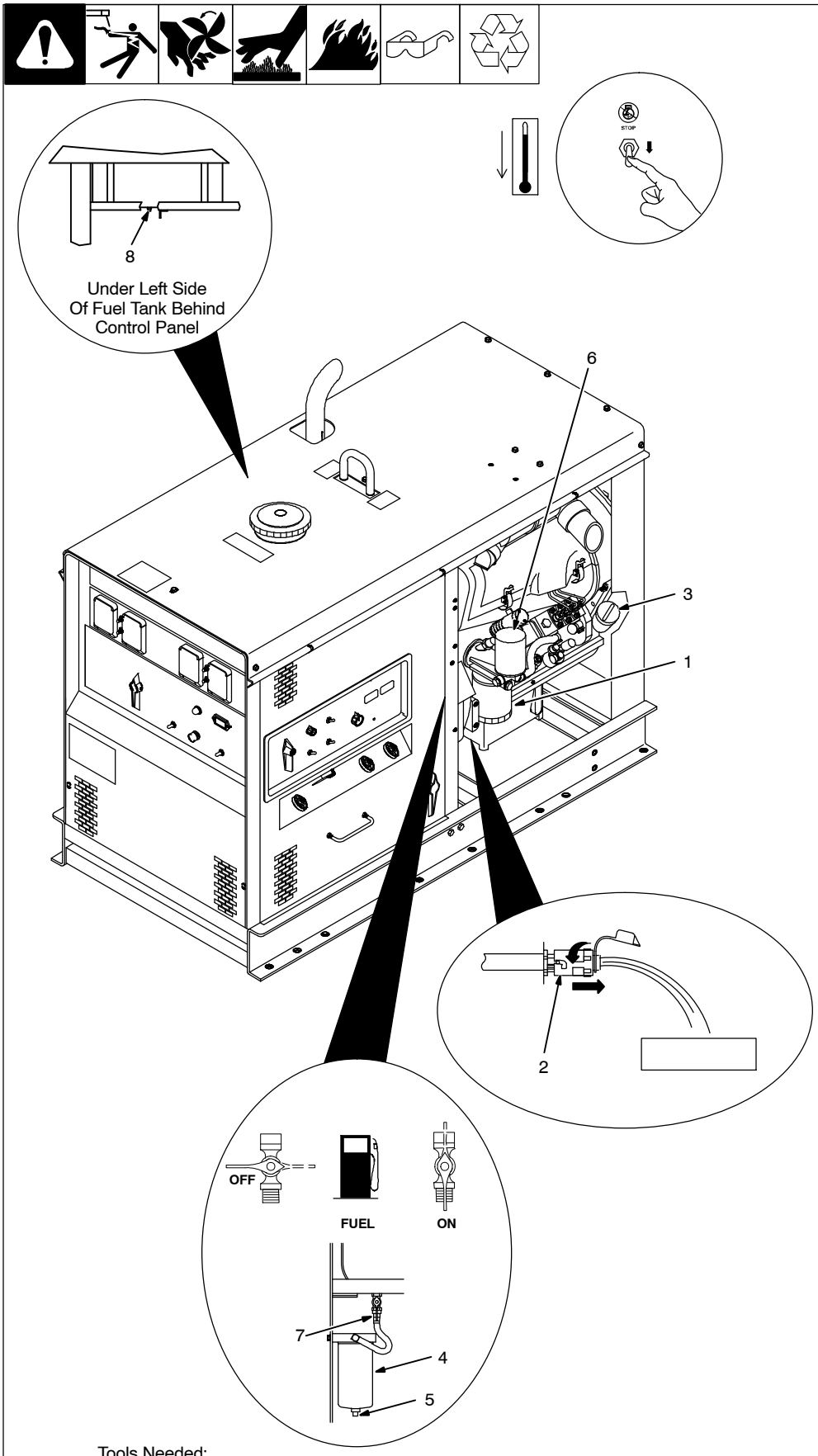
Air pressure must not exceed 100 psi (690 kPa). Use 1/8 in (3 mm) nozzle and keep nozzle at least 2 in (51 mm) from inside of element. Replace primary element if it has holes or damaged gaskets.

Reinstall primary element and cap (dust ejector down).




aircleaner1 2/01 – ST-153 929-B / ST-153 585 / Ref. S-0698-B

## 8-4. Servicing Fuel And Lubrication Systems




**Stop engine and let cool.**

1 Oil Filter
2 Oil Drain Valve And Hose
3 Oil Fill Cap
4 Primary Fuel Filter (Fuel/ Water Separator)
5 Petcock
6 Secondary Fuel Filter
7 Fuel Shutoff Valve Lever
8 Sludge Drain Plug

**To change oil and filter:**

See engine manual.

**To drain water from fuel system:**

Open primary fuel filter petcock and drain water into metal container. Close petcock when water-free fuel flows.

**To replace primary fuel filter:**

Close shutoff valve and turn filter counterclockwise. Remove filter.

Apply thin coat of fuel to gasket on new filter. Install new filter and turn clockwise. Open shutoff valve. Use primer pump to prime injector system (see Section 8-7).

Inspect fuel line, and replace if cracked or worn.

**To replace secondary fuel filter:**

See engine manual.

**To drain sludge from fuel tank:**

☞ *This procedure should only be done by a Factory Authorized Service Agent.*

Remove Welder A (left) control panel to access sludge drain plug.

Put metal container under drain and remove plug. Reinstall plug when sludge has drained.

Reinstall control panel.

**After servicing, start engine and check for fuel leaks.**

**Stop engine, tighten connections as necessary, and wipe up spilled fuel.**

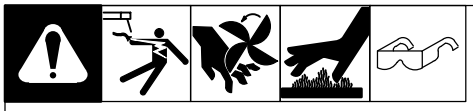
Close doors.

Tools Needed:

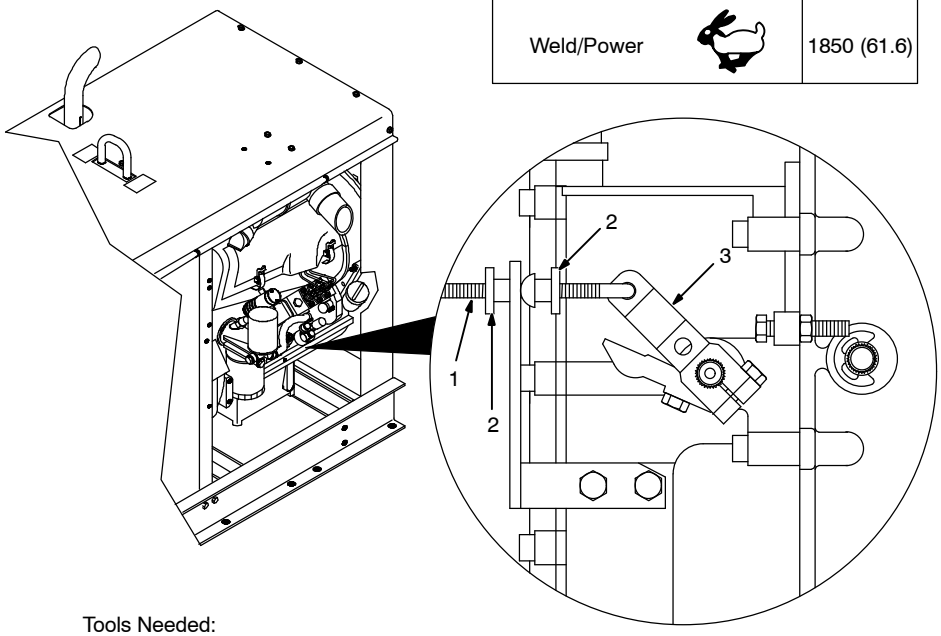
3/8, 7/16, 3/4 in

225 543 / 804 285-A / 013 466

## 8-5. Adjusting Engine Speed



| Engine Speed (No Load) | RPM (HZ) |
|---|---|
| Weld/Power | 1850 (61.6) |




Tools Needed:

3/8 in

Engine speed is factory set and should not require adjustment. After tuning engine, check engine speed with tachometer. See table for proper no load speed. If necessary, adjust speed as follows:

1 Adjustment Rod

2 Thumbwheels

Start engine and turn thumbwheels to increase or decrease engine no load speed.

3 Speed Control Lever

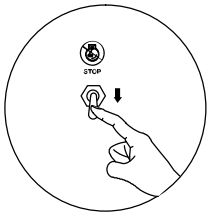
Rotating lever clockwise increases engine speed.

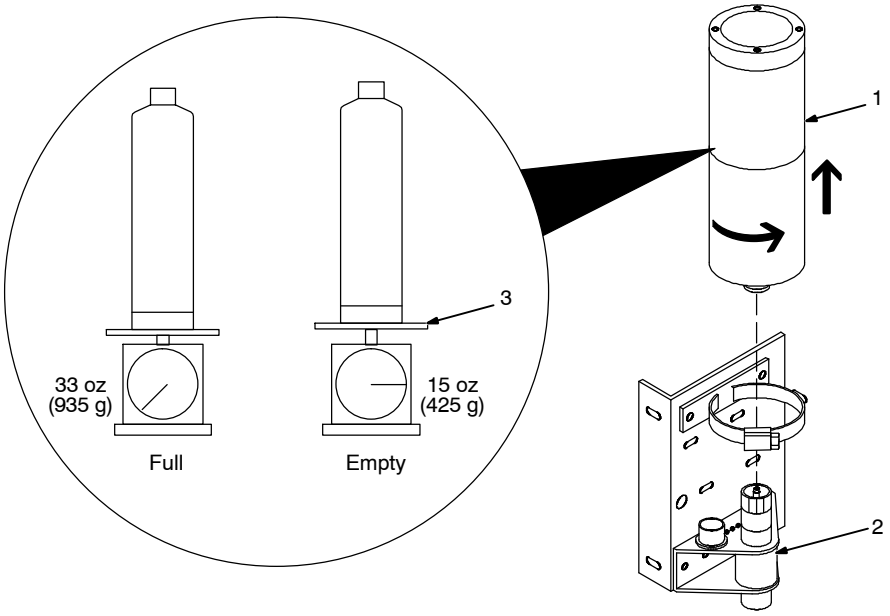
**Stop engine.**

Close side door.

804 285-A

## 8-6. Servicing Optional Ether Starting Aid




**Stop engine.**

**Improper handling or exposure to ether can harm your health. Follow manufacturer's safety instructions on cylinder.**

If engine does not start in cold weather, check ether cylinder as follows:

Remove cylinder from valve.

1 Ether Cylinder

2 Valve

3 Scale

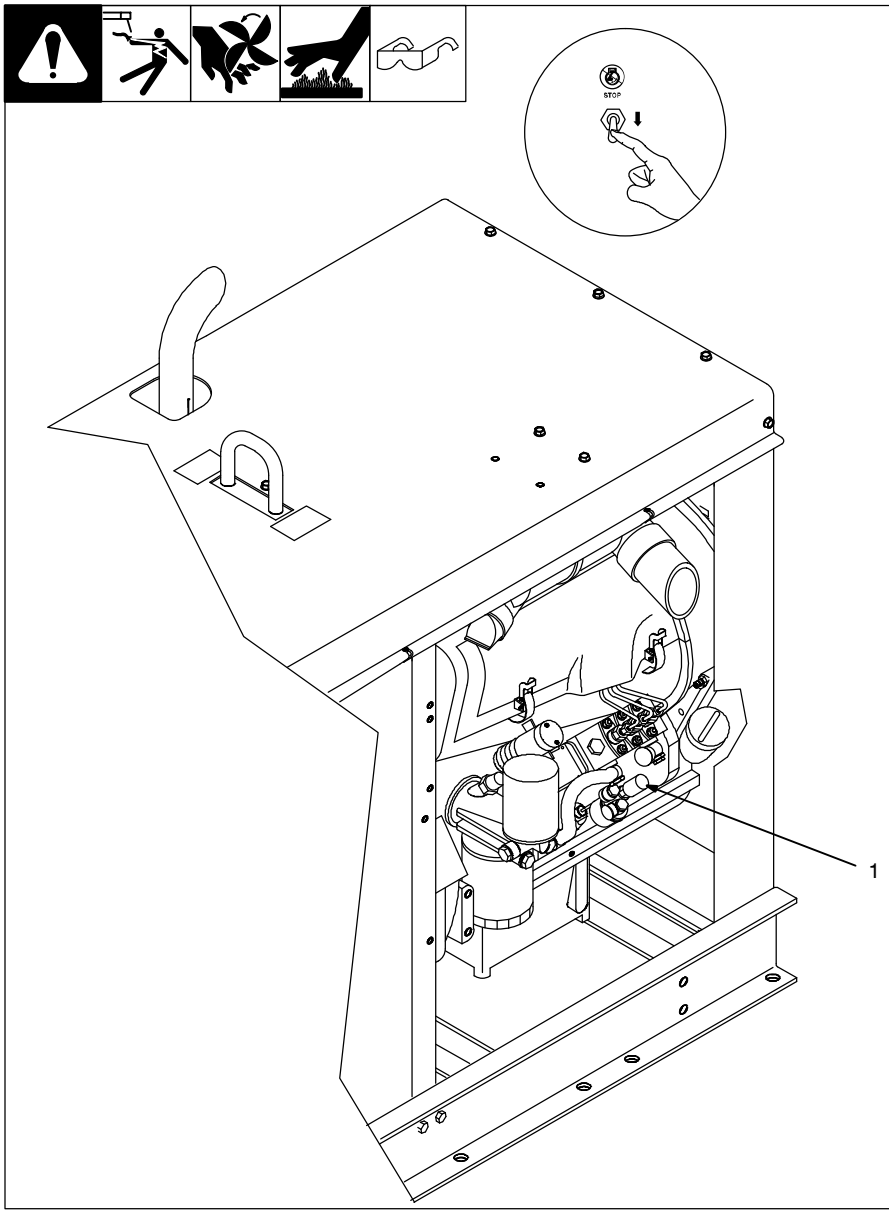
Weigh cylinder to see if it is empty.

Be sure atomizer is not plugged and valve fitting is clean.

Replace cylinder according to Section 5-18.

ether2 7/96 – 153 382-A / Ref. 225 543 / S-0692

## 8-7. Priming Fuel System




**Stop engine.**

Open right hand side door.

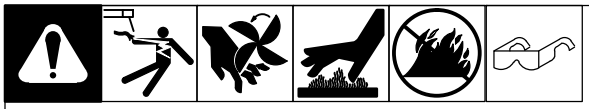
1 Primer Pump

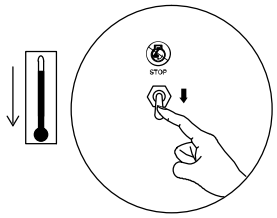
After running out of fuel or changing fuel filters, use pump to prime fuel system.

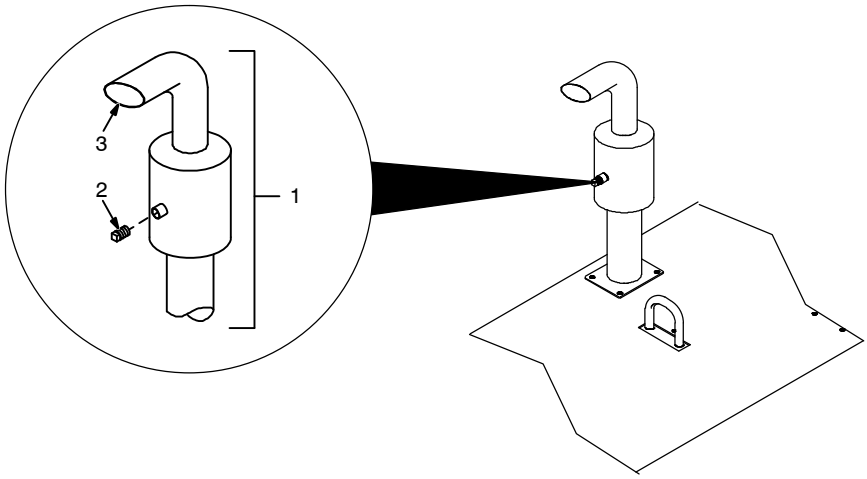
Push primer pump approximately 12 times to pump fuel into the injector system. Use Engine Control switch to start engine.

225 543 / 804 286-A

## 8-8. Inspecting And Cleaning Optional Spark Arrestor Muffler






**Stop engine and let cool.**

1 Spark Arrestor Muffler

2 Cleanout Plug

Remove plug and remove any dirt covering cleanout hole.

3 Exhaust Pipe

Start engine and run several minutes to blow out cleanout hole. If nothing blows out of hole, briefly cover end of exhaust pipe with fireproof material.

**Stop engine and let cool.**

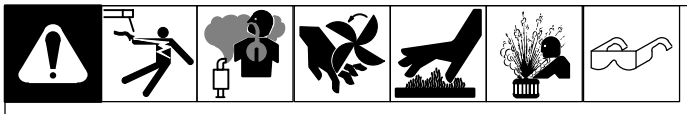
Reinstall cleanout plug.

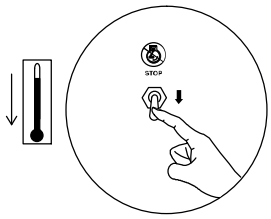
Tools Needed:

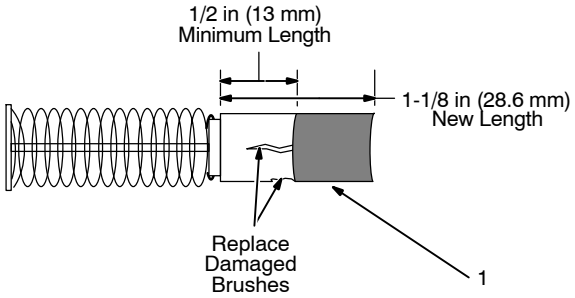
3/8 in

Ref. 800 633-B / Ref. 225 543

## 8-9. Checking Generator Brushes






**Stop engine and let cool.**

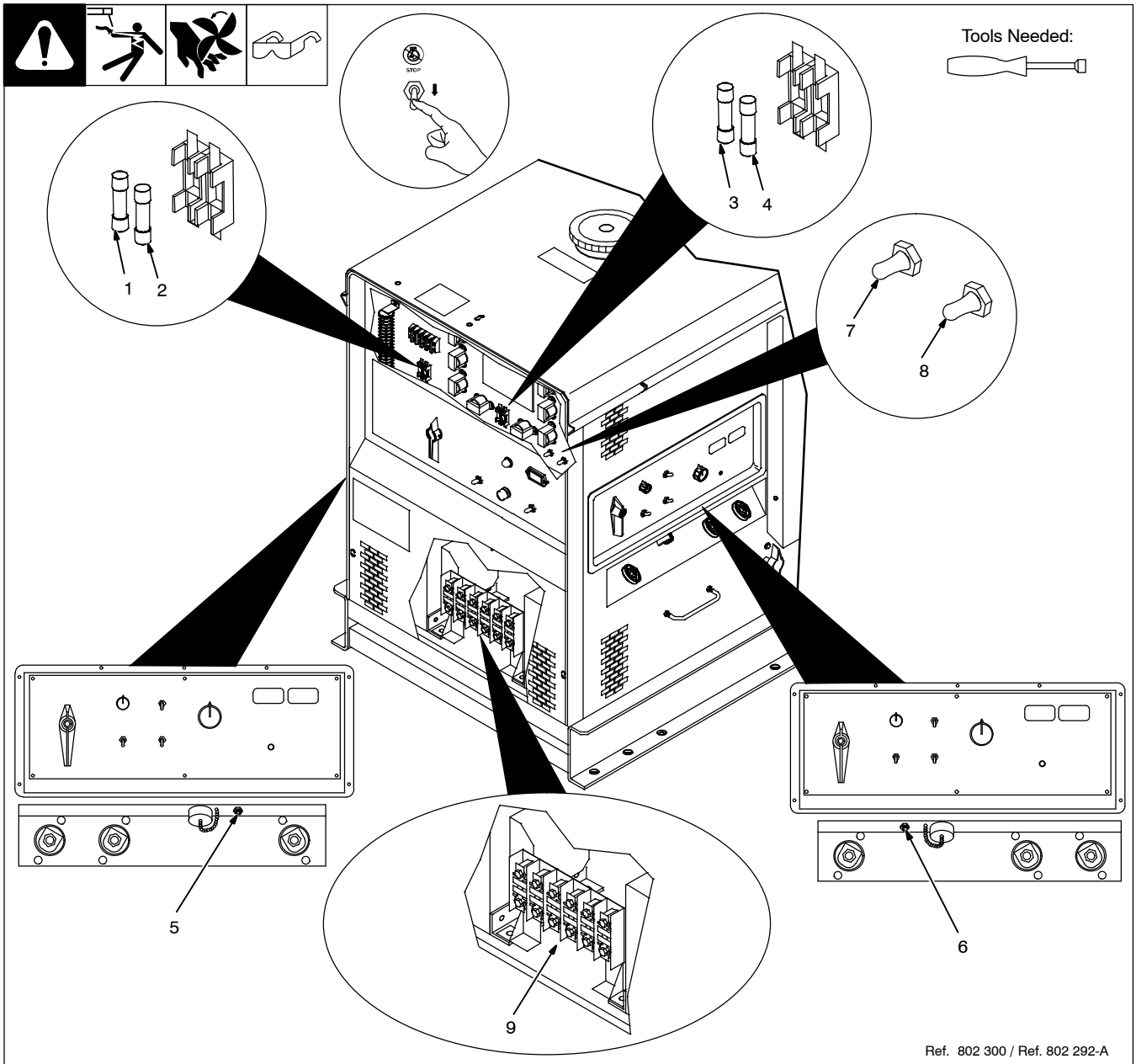
1 Generator Brush With Spring

Mark and disconnect leads at brush holder cap. Remove brushes.

Replace brushes if damaged or if brush material is at or near minimum length.

Ref 225 543 / S–0233–A

## 8-10. Circuit Protection




Ref. 802 300 / Ref. 802 292-A

**Stop engine.**

☞ *When a supplementary protector or fuse opens, it usually indicates a more serious problem exists. Contact Factory Authorized Service Agent.*

1 Fuse F1

2 Fuse F2

3 Fuse F3

4 Fuse F4

Open front panel.

Fuse F1 protects the exciter excitation winding. If F1 opens, there is no weld or generator power output on both sides.

Fuse F2 protects the exciter main field excitation winding. If F2 opens, there is no weld output on both sides.

Fuse F3 protects Welder A (left) control board PC1. If F3 opens, Welder A (left) weld output stops.

Fuse F4 protects Welder B (right) control board PC1. If F4 opens, Welder B (right) weld output stops.

5 Supplementary Protector CB5

6 Supplementary Protector CB6

7 Supplementary Protector CB7

8 Supplementary Protector CB8

Supplementary Protector CB5 protects the 24 volt and 115 volt AC output to Welder A (left) remote receptacle RC9. If CB5 opens, Welder A (left) RC9 24 and 115 volt AC output stops.

Supplementary Protector CB6 protects the 24 volt and 115 volt AC output to Welder B (right) remote receptacle RC8. If CB6 opens, Welder B (right) RC8 24 and 115 volt AC output stops.

Supplementary Protector CB7 protects field current regulator board PC4. If CB7 opens, weld and generator power output on both sides stops.

Supplementary Protector CB8 protects the generator field flashing circuit. If CB8 opens, weld and generator power output may continue if generator maintains excitation. Weld and generator power output stops if generator requires field flashing circuit to restore excitation.

Press button to reset supplementary protector.

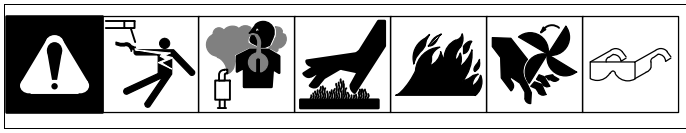
9 Fuses F11, F12, F13, F21, F22, F23

These fuses protect the weld stator windings. If fuse F11, F12, or F13 opens, Welder B (right) side output is erratic or low. If fuse F21, F22, or F23 opens, Welder A (left) side output is erratic or low.

10 Thermostats TP3 And TP4 (Internal – Not Shown)

Thermostat TP3 protects Welder A (left) SR2 rectifier and TP4 protects Welder B (right) SR3 rectifier from overheating. If TP3 or TP4 opens, Welder A (left) or Welder B (right) weld output stops and the High Temp. Shutdown light goes on. Wait fifteen minutes for module to cool and thermostat to automatically reset. Reduce amperage, voltage, or duty cycle before welding.

## 8-11. Troubleshooting



### A. Welding

| Trouble | Remedy |
|---|---|
| No weld output on either side; generator power output okay at AC receptacles. | Place Output (Contactor) switches in On (Hot) position, or place switches in Remote position and connect remote contactors to remote receptacles RC8 and RC9 (see Section 6-3). |
| | Unit overheated (High Temp. Shutdown light goes on); wait several minutes for thermostat(s) TP3 and TP4 to reset (see Section 8-10). |
| | Check position of Process Selector switches and Welder Selector switch. All weld output stops if either Process Selector switch is placed in CV position when Welder Selector switch is in Welder B position (see Sections 6-1 and 6-3). |
| | Check fuse F2, and replace if open (see Section 8-10). Have Factory Authorized Service Agent check field current regulator board PC4. |
| | Have Factory Authorized Service Agent check field current regulator board PC4 and Welder Selector switch S2. |
| No weld output on either side and no generator power output at AC receptacles. | Disconnect equipment from generator power receptacles during start-up. |
| | Check fuse F1, and replace if open (see Section 8-10). |
| | Reset supplementary protectors CB7 and/or CB8 (see Section 8-10). |
| | Have Factory Authorized Service Agent check brushes and slip rings, field excitation circuit, rotor, stator, and field current regulator board PC4. |
| No Welder A (left) weld output; Welder B (right) weld output okay. | Check fuse F3, and replace if open (see Section 8-10). |
| | Check position of Welder Selector switch. Welder A (left) weld output stops when Welder Selector switch is placed in Welder B position (see Section 6-1). |
| | Unit overheated (High Temp. Shutdown light goes on); wait several minutes for thermostat(s) TP3 to reset (see Section 8-10). |
| | Have Factory Authorized Service Agent check Welder A (left) contactor circuit. |
| No Welder B (right) weld output; Welder A (left) weld output okay; | Check fuse F4, and replace if open (see Section 8-10). |
| | Unit overheated (High Temp. Shutdown light goes on); wait several minutes for thermostat(s) TP4 to reset (see Section 8-10). |
| | Have Factory Authorized Service Agent check Welder B (right) contactor circuit. |
| Low Welder A (left) weld output; Welder B (right) output okay. | Check position of Process Selector switch (see Section 6-3). |
| | Increase Amperage/Voltage control setting. |
| | Check fuses F21, F22, and F23, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR2. |
| | Have Factory Authorized Service Agent check main rectifier SR2, synchronization transformers T5, T6 and T7, and control board PC1. |
| Low Welder B (right) weld output; Welder A (left) weld output okay. | Check position of Process Selector switch (see Section 6-3). |
| | Increase Amperage/Voltage control setting. |
| | Check fuses F11, F12, and F13, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR3. |
| | Have Factory Authorized Service Agent check main rectifier SR3, synchronization transformers T8, T9 and T10, and control board PC5. |

| Trouble | Remedy |
|---|---|
| Low weld output on both sides. | Check engine speed, and adjust if necessary (see Section 8-5). |
| | Check position of Process Selector switch(s) (see Section 6-3). |
| | Increase Amperage/Voltage controls settings. |
| | Have Factory Authorized Service Agent check field current regulator board PC4. |
| High weld output on both sides. | Have Factory Authorized Service Agent check field current regulator board PC4. |
| Erratic weld output on either side. | Check and tighten connections inside and outside unit. |
| | Be sure connection to work piece is clean and tight. |
| | Use dry, properly stored electrodes. |
| | Remove excessive coils from weld cables. |
| | Check Process Selector switch(s) connections and contacts. |
| | Welder A (left) side: check fuses F21, F22, and F23, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR2.<br>Welder B (right) side: check fuses F11, F12, and F13, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR3. |
| | Have Factory Authorized Service Agent check Welder Selector switch S2. |
| Low open-circuit voltage on both sides. | Check engine speed, and adjust if necessary (see Section 8-5). |
| | Have Factory Authorized Service Agent check field current regulator board PC4. |
| Low open-circuit voltage on either side. | Increase Amperage/Voltage control setting. |
| | Welder A (left) side: check fuses F21, F22, and F23, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR2.<br>Welder B (right) side: check fuses F11, F12, and F13, and replace if open. If fuse(s) are open, have Factory Authorized Service Agent check main rectifier SR3. |
| | Have Factory Authorized Service Agent check main rectifiers SR2 and SR3, synchronization transformers T5 thru T10, and control board PC1 or PC5. |
| No control of weld output on either side. | Place A/V Control switch in Panel position, or place switch in Remote position and connect remote control to remote receptacle RC8 or RC9 (see Sections 5-19 and 6-3). |
| | Have Factory Authorized Service Agent check control board PC1 or PC5. |
| No voltage control on either side; open-circuit voltage present. | Repair or replace remote device. |
| | Place A/V Control switch in Panel position, or place switch in Remote position and connect remote control to remote receptacle RC8 or RC9 (see Sections 5-19 and 6-3). |
| | Check connections to Remote receptacle RC8 and RC9. |
| | Have Factory Authorized Service Agent check control board PC1 or PC5. |
| Wire feeder does not work (either side). | Reset Welder A (left) circuit breaker CB5 or Welder B (right) circuit breaker CB6 (see Section 8-10). |
| | Check position of Process Selector switches and Welder Selector switch. All weld output stops if either Process Selector switch is placed in CV position when Welder Selector switch is in Welder B position (see Sections 6-1 and 6-3). |
| | Check connections to Remote 14 receptacle RC8 (see Section 5-19). |
| | Place optional Polarity switches in Reverse position. There is no CV weld output when Polarity switch is in Straight position. |
| | Have Factory Authorized Service Agent check brushes and slip rings, and field excitation circuit. |
| | Repair or replace wire feeder. |

## B. Generator Power

| Trouble | Remedy |
|---|---|
| No output at generator power AC receptacles. | Reset receptacle supplementary protectors (see Section 7-1). |
| | Press GFCI reset button on 120 volt GFCI receptacles (see Section 7-1). |
| | Check fuse F1, and replace if open (see Section 8-10). |
| | Check receptacle(s) for continuity and proper connections. Replace receptacle(s) if necessary. |
| | Have Factory Authorized Service Agent check brushes and slip rings. |
| High or low output at generator power AC receptacles. | Check engine speed, and adjust if necessary (see Section 8-5). |

## C. Engine

| Trouble | Remedy |
|---|---|
| Engine will not crank. | Check battery voltage, and replace battery if necessary. |
| | Check battery connections and tighten if necessary. |
| | Circuit breaker CB12 may have tripped. CB12 automatically resets when fault is corrected. Have Factory Authorized Service Agent check wiring harness and components. |
| Engine cranks but does not start. | Check fuel level (see Section 5-7). |
| | Open fuel valve (see Section 5-7). |
| | Check battery voltage, and replace battery if necessary. Check engine charging system according to engine manual. |
| | Have Factory Authorized Service Agent check time delay relay TD1, control relay CR5, fuel pump, and fuel solenoid FS1. |
| | Air in fuel system. Use primer pump to prime fuel system (see Section 8-7). |
| | See engine manual. |
| Engine suddenly stops. | Check oil level (see Section 5-7). Automatic shutdown system stops engine if oil pressure is too low or oil temperature is too high. Automatic shutdown system is inhibited for 30 seconds after start–up. |
| | See engine manual. |
| Engine slowly stopped and cannot be restarted. | Check fuel level (see Section 5-7). |
| | Check engine air and fuel filters (see Sections 8-3 and 8-4). |
| Engine hard to start in cold weather. | Use starting aid switch (see Section 6-1). |
| | Keep battery in good condition. Store battery in warm area off cold surface. |
| | Use fuel formulated for cold weather (diesel fuel can gel in cold weather). Contact local fuel supplier for fuel information. |
| | Use correct grade oil for cold weather (see Section 8-2). |
| Battery discharges between uses. | Clean battery, terminals, and posts with baking soda and water solution; rinse with clear water. |
| | Periodically recharge battery (approximately every 3 months). |
| | Replace battery. |
| | Check voltage regulator and connections according to engine manual. |
| Engine uses oil during run-in period; wetstacking occurs. | Dry engine (see Section 10). |

# SECTION 9 – ELECTRICAL DIAGRAMS

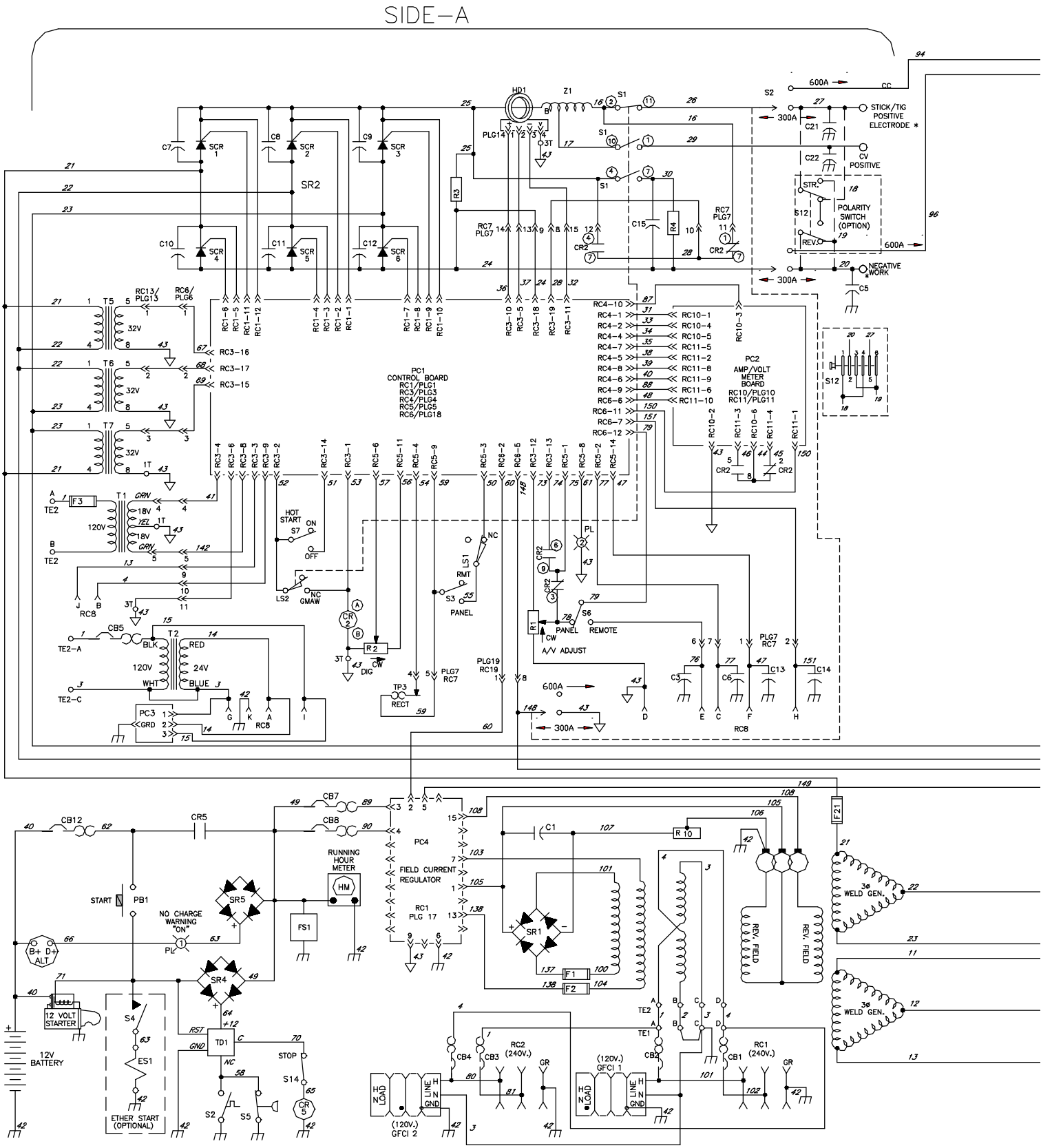
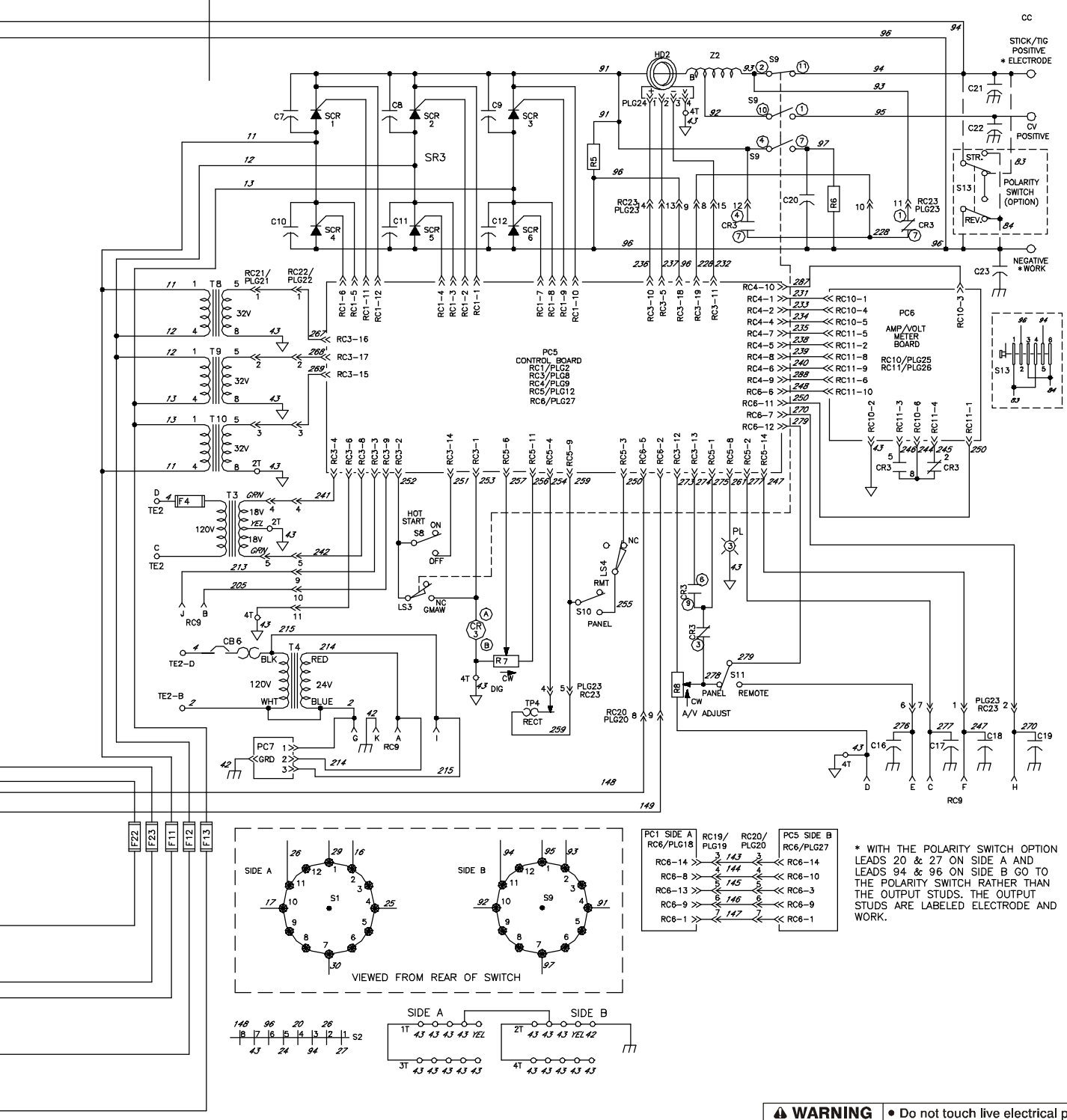



**Figure 9-1. Circuit Diagram For Welding Generator**

# SIDE – B




* WITH THE POLARITY SWITCH OPTION LEADS 20 & 27 ON SIDE A AND LEADS 94 & 96 ON SIDE B GO TO THE POLARITY SWITCH RATHER THAN THE OUTPUT STUDS. THE OUTPUT STUDS ARE LABELED ELECTRODE AND WORK.

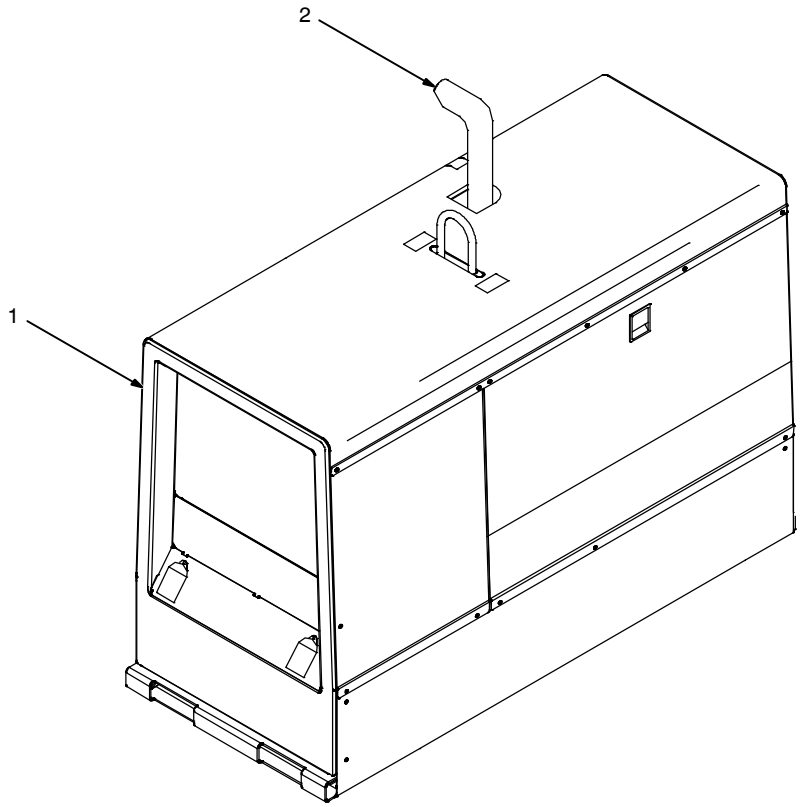
| ⚠ WARNING | • Do not touch live electrical parts.<br>• Disconnect input power or stop engine before servicing.<br>• Do not operate with covers removed.<br>• Have only qualified persons install, use, or service this unit. |
|---|---|
| ELECTRIC SHOCK HAZARD | |

225 565-C

# SECTION 10 – RUN-IN PROCEDURE



## 10-1. Wetstacking




⚠ **Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.**

1 Welding Generator

Run diesel engines near rated voltage and current during run-in period to properly seat piston rings and prevent wetstacking. See nameplate, rating label, or specifications section in this manual to find rated voltage and current.

☞ *Do not idle engine longer than necessary. Piston rings seat faster if engine runs at weld/power rpm, and the welding generator is kept loaded during run-in.*

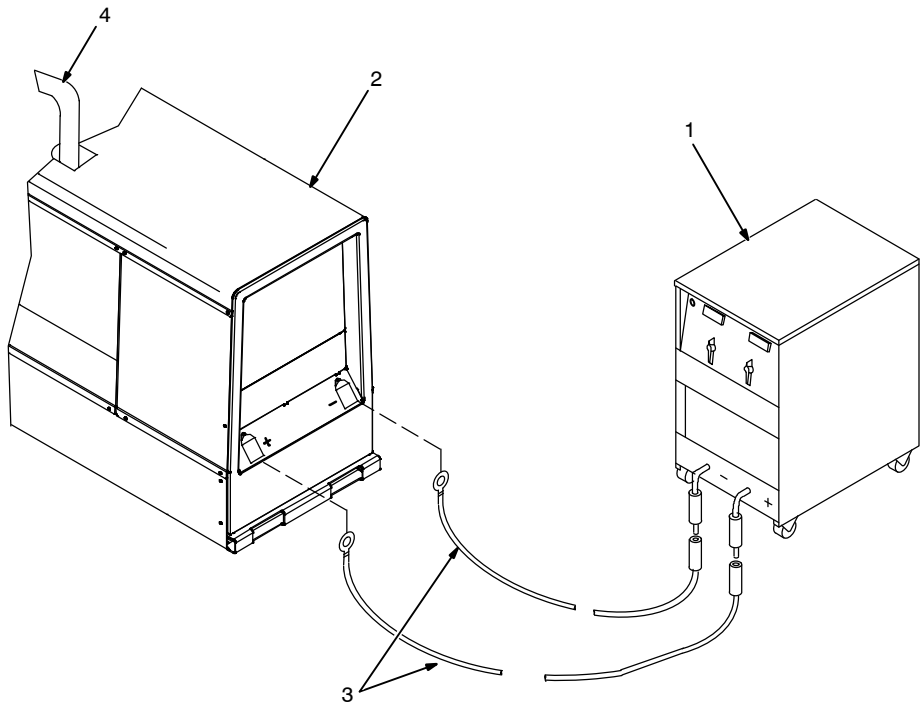
2 Engine Exhaust Pipe

Wetstacking is unburned fuel and oil in the exhaust pipe and occurs during run-in if the engine is run too long at light load or idle rpm.

If exhaust pipe is coated with a wet, black, tar-like substance, dry the engine using one of the following run-in procedures.

See the engine manual for additional engine run-in information.

## 10-2. Run-In Procedure Using Load Bank




**Stop engine.**

**Do not touch hot exhaust pipe, engine parts, or load bank/grid.**

**Keep exhaust and pipe away from flammables.**

**Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.**

1 Load Bank

Turn all load bank switches Off. If needed, connect load bank to 115 volts ac wall receptacle or generator auxiliary power receptacle.

2 Welding Generator

Place Welder Selector switch in Welder B position (600 Amps), A/V control in minimum position, and both Process Selector switches in Stick/TIG position.

3 Weld Cables

Connect load bank to generator Welder B (right) weld output terminals using proper size weld cables with correct connectors. Observe correct polarity.

Start engine and run for several minutes.

Set load bank switches and then adjust generator A/V control so load equals 350 Amps at 40 volts.

Check generator and load bank meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

☞ *Check oil level frequently during run-in; add oil if needed.*

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place A/V control in minimum position, then turn off load bank to remove load. Run engine several minutes at no load.

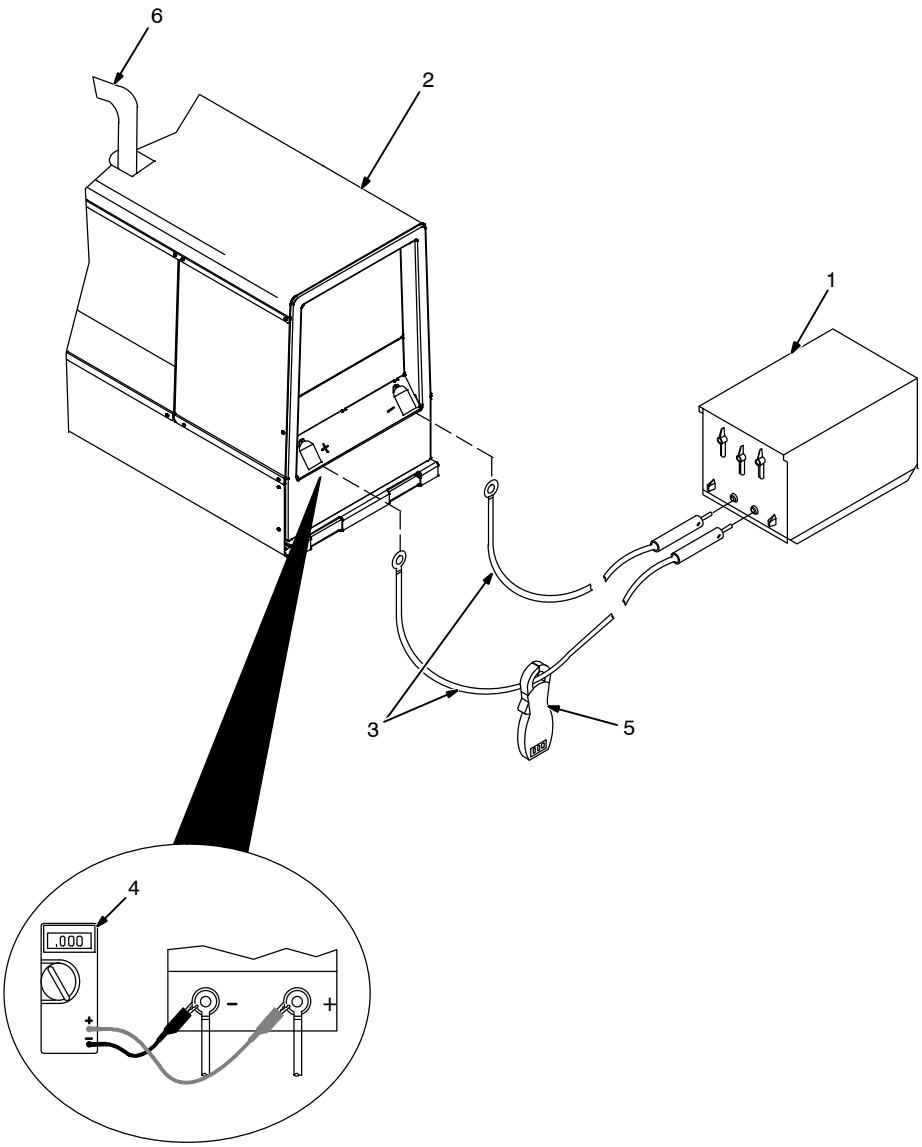
**Stop engine and let cool.**

4 Engine Exhaust Pipe

Repeat procedure if wetstacking is present.

S-0683

## 10-3. Run-In Procedure Using Resistance Grid




**Stop engine.**

**Do not touch hot exhaust pipe, engine parts, or load bank/grid.**

**Keep exhaust and pipe away from flammables.**

**Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.**

1 Resistance Grid

Use grid sized for generator rated output.

Turn Off grid.

2 Welding Generator

Place Welder Selector switch in Welder B position (600 Amps), A/V control in minimum position, and both Process Selector switches in Stick/TIG position.

3 Weld Cables

Connect grid to generator Welder B (right) weld output terminals using proper size weld cables with correct connectors (polarity is not important).

4 Voltmeter

5 Clamp-On Ammeter

Connect voltmeter and ammeter as shown, if not provided on generator.

Start engine and run for several minutes.

Set grid switches and then adjust generator A/V control so load equals 350 Amps at 40 volts.

Check generator and meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

☞ *Check oil level frequently during run-in; add oil if needed.*

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place A/V control in minimum position, then shut down grid to remove load. Run engine several minutes at no load.

**Stop engine and let cool.**

6 Engine Exhaust Pipe

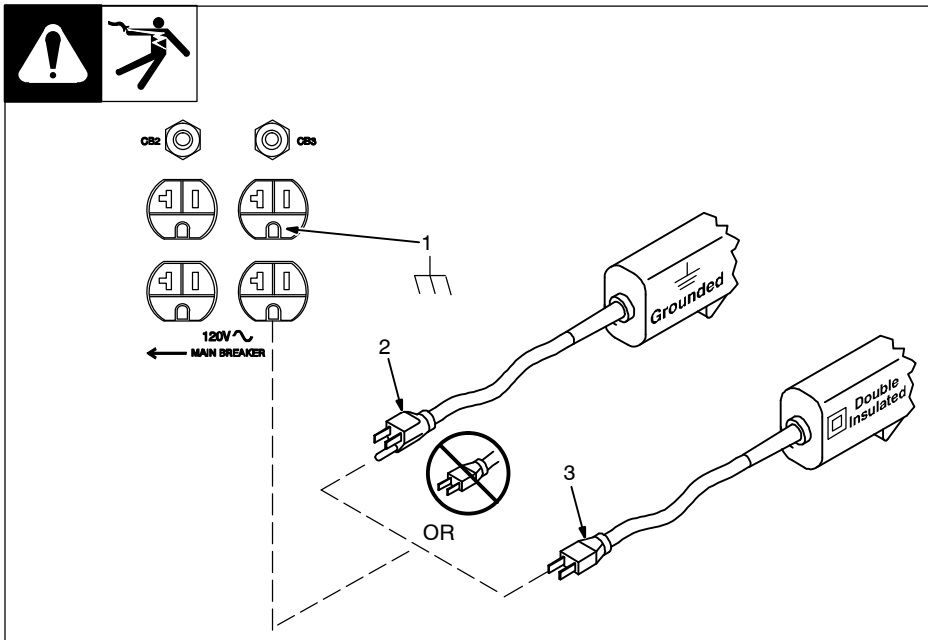
Repeat procedure if wetstacking is present.

S-0684

# SECTION 11 – GENERATOR POWER GUIDELINES

☞ *The views in this section are intended to be representative of all engine-driven welding generators. Your unit may differ from those shown.*

## 11-1. Selecting Equipment




1 Generator Power Receptacles – Neutral Bonded To Frame

2 3-Prong Plug From Case Grounded Equipment

3 2-Prong Plug From Double Insulated Equipment

☞ *Be sure equipment has double insulated symbol and/or wording on it.*

⚠ **Do not use 2-prong plug unless equipment is double insulated.**

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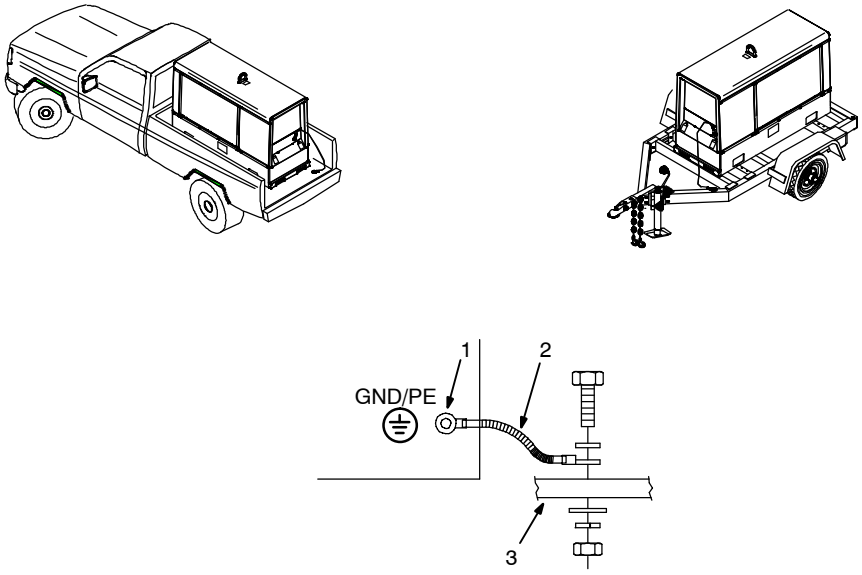
## 11-2. Grounding Generator To Truck Or Trailer Frame




⚠ **Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.**

⚠ **Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

1 Equipment Grounding Terminal (On Front Panel)

2 Grounding Cable (Not Supplied)

3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #8 AWG or larger insulated copper wire.

☞ *Electrically bond generator frame to vehicle frame by metal-to-metal contact.*

⚠ **Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.**

⚠ **If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

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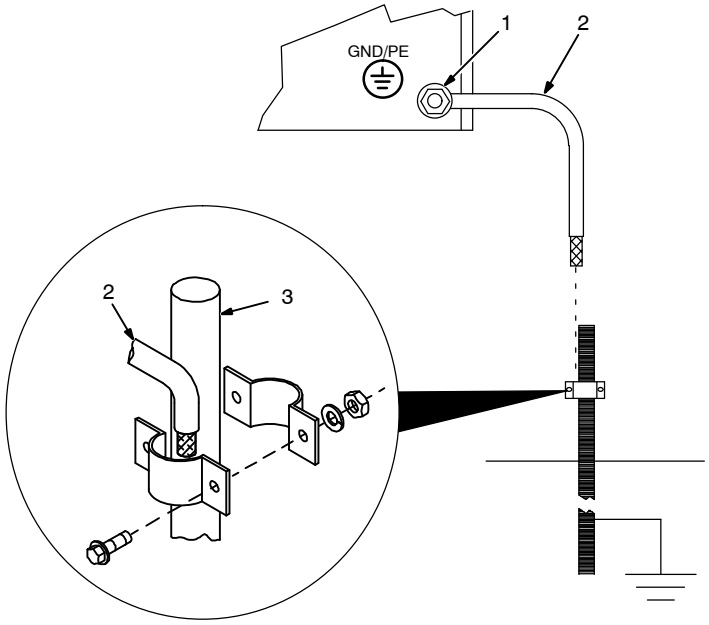
## 11-3. Grounding When Supplying Building Systems




1 Equipment Grounding Terminal

2 Grounding Cable

Use #8 AWG or larger insulated copper wire.

3 Ground Device

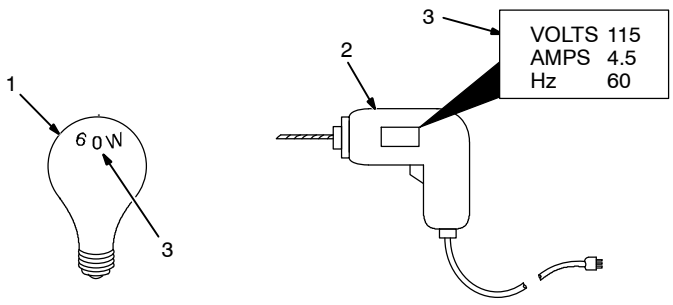
☞ *Use ground device as stated in electrical codes.*

**Ground generator to system earth ground if supplying power to a premises (home, shop, farm) wiring system.**

**Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

ST-800 576-B

## 11-4. How Much Power Does Equipment Require?




1 Resistive Load

A light bulb is a resistive load and requires a constant amount of power.

2 Non-Resistive Load

Equipment with a motor is a non-resistive load and requires approximately six times more power while starting the motor than when running (see Section 11-8).

3 Rating Data

Rating shows volts and amperes, or watts required to run equipment.

**Amperes x Volts = Watts**

**Example 1:** If a drill uses 4.5 amperes at 115 volts, calculate its running power requirement in watts.

4.5 A x 115 V = 520 W

The load applied by the drill is 520 watts.

**Example 2:** If three 200 watt flood lamps are used with the drill from Example 1, add the individual loads to calculate total load.

(3 x 200W) + 520 W = 1120 W

The total load applied by the three flood lamps and drill is 1120 watts.

S-0623

## 11-5. Approximate Power Requirements For Industrial Motors

| Industrial Motors | Rating | Starting Watts | Running Watts |
|---|---|---|---|
| Split Phase | 1/8 HP | 800 | 300 |
| | 1/6 HP | 1225 | 500 |
| | 1/4 HP | 1600 | 600 |
| | 1/3 HP | 2100 | 700 |
| | 1/2 HP | 3175 | 875 |
| Capacitor Start-Induction Run | 1/3 HP | 2020 | 720 |
| | 1/2 HP | 3075 | 975 |
| | 3/4 HP | 4500 | 1400 |
| | 1 HP | 6100 | 1600 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10550 | 2850 |
| | 3 HP | 15900 | 3900 |
| | 5 HP | 23300 | 6800 |
| Capacitor Start-Capacitor Run | 1-1/2 HP | 8100 | 2000 |
| | 5 HP | 23300 | 6000 |
| | 7-1/2 HP | 35000 | 8000 |
| | 10 HP | 46700 | 10700 |
| Fan Duty | 1/8 HP | 1000 | 400 |
| | 1/6 HP | 1400 | 550 |
| | 1/4 HP | 1850 | 650 |
| | 1/3 HP | 2400 | 800 |
| | 1/2 HP | 3500 | 1100 |

## 11-6. Approximate Power Requirements For Farm/Home Equipment

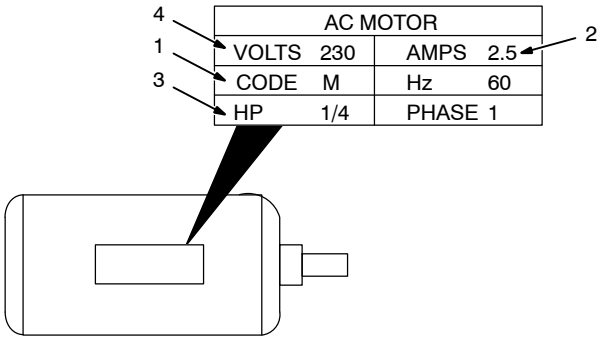
| Farm/Home Equipment | Rating | Starting Watts | Running Watts |
|---|---|---|---|
| Stock Tank De-Icer | | 1000 | 1000 |
| Grain Cleaner | 1/4 HP | 1650 | 650 |
| Portable Conveyor | 1/2 HP | 3400 | 1000 |
| Grain Elevator | 3/4 HP | 4400 | 1400 |
| Milk Cooler | | 2900 | 1100 |
| Milker (Vacuum Pump) | 2 HP | 10500 | 2800 |
| FARM DUTY MOTORS | 1/3 HP | 1720 | 720 |
| Std. (e.g. Conveyors, | 1/2 HP | 2575 | 975 |
| Feed Augers, Air | 3/4 HP | 4500 | 1400 |
| Compressors) | 1 HP | 6100 | 1600 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10550 | 2850 |
| | 3 HP | 15900 | 3900 |
| | 5 HP | 23300 | 6800 |
| High Torque (e.g. Barn | 1-1/2 HP | 8100 | 2000 |
| Cleaners, Silo Unloaders, | 5 HP | 23300 | 6000 |
| Silo Hoists, Bunk Feeders) | 7-1/2 HP | 35000 | 8000 |
| | 10 HP | 46700 | 10700 |
| 3-1/2 cu. ft. Mixer | 1/2 HP | 3300 | 1000 |
| High Pressure 1.8 Gal/Min | 500 PSI | 3150 | 950 |
| Washer 2 gal/min | 550 PSI | 4500 | 1400 |
| 2 gal/min | 700 PSI | 6100 | 1600 |
| Refrigerator or Freezer | | 3100 | 800 |
| Shallow Well Pump | 1/3 HP | 2150 | 750 |
| | 1/2 HP | 3100 | 1000 |
| Sump Pump | 1/3 HP | 2100 | 800 |
| | 1/2 HP | 3200 | 1050 |

## 11-7. Approximate Power Requirements For Contractor Equipment

| Contractor | Rating | Starting Watts | Running Watts |
|---|---|---|---|
| Hand Drill | 1/4 in | 350 | 350 |
| | 3/8 in | 400 | 400 |
| | 1/2 in | 600 | 600 |
| Circular Saw | 6-1/2 in | 500 | 500 |
| | 7-1/4 in | 900 | 900 |
| | 8-1/4 in | 1400 | 1400 |
| Table Saw | 9 in | 4500 | 1500 |
| | 10 in | 6300 | 1800 |
| Band Saw | 14 in | 2500 | 1100 |
| Bench Grinder | 6 in | 1720 | 720 |
| | 8 in | 3900 | 1400 |
| | 10 in | 5200 | 1600 |
| Air Compressor | 1/2 HP | 3000 | 1000 |
| | 1 HP | 6000 | 1500 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10500 | 2800 |
| Electric Chain Saw | 1-1/2 HP, 12 in | 1100 | 1100 |
| | 2 HP, 14 in | 1100 | 1100 |
| Electric Trimmer | Standard 9 in | 350 | 350 |
| | Heavy Duty 12 in | 500 | 500 |
| Electric Cultivator | 1/3 HP | 2100 | 700 |
| Elec. Hedge Trimmer | 18 in | 400 | 400 |
| Flood Lights | HID | 125 | 100 |
| | Metal Halide | 313 | 250 |
| | Mercury | 1000 | |
| | Sodium | 1400 | |
| | Vapor | 1250 | 1000 |
| Submersible Pump | 400 gph | 600 | 200 |
| Centrifugal Pump | 900 gph | 900 | 500 |
| Floor Polisher | 3/4 HP, 16 in | 4500 | 1400 |
| | 1 HP, 20 in | 6100 | 1600 |
| High Pressure Washer | 1/2 HP | 3150 | 950 |
| | 3/4 HP | 4500 | 1400 |
| | 1 HP | 6100 | 1600 |
| 55 gal Drum Mixer | 1/4 HP | 1900 | 700 |
| Wet & Dry Vac | 1.7 HP | 900 | 900 |
| | 2-1/2 HP | 1300 | 1300 |

## 11-8. Power Required To Start Motor

| Single-Phase Induction Motor Starting Requirements | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Motor Start Code** | G | H | J | K | L | M | N | P |
| **KVA/HP** | 6.3 | 7.1 | 8.0 | 9.0 | 10.0 | 11.2 | 12.5 | 14.0 |




1 Motor Start Code

2 Running Amperage

3 Motor HP

4 Motor Voltage

To find starting amperage:

**Step 1:** Find code and use table to find kVA/HP. If code is not listed, multiply running amperage by six to find starting amperage.

**Step 2**: Find Motor HP and Volts.

**Step 3:** Determine starting amperage (see example).

Welding generator amperage output must be at least twice the motor's running amperage.

**(kVA/HP x HP x 1000) / Volts = Starting Amperage**

Example: Calculate starting amperage required for a 230 V, 1/4 HP motor with a motor start code of M.

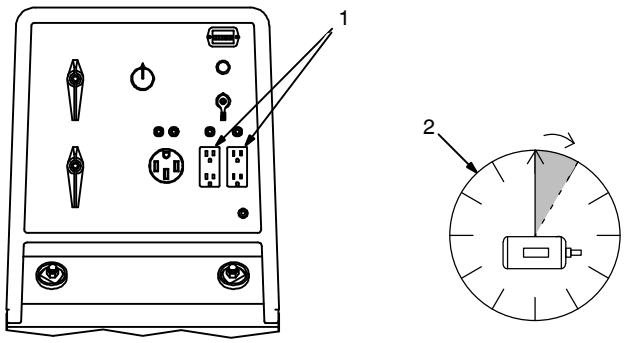
Volts = 230, HP = 1/4, kVA/HP = 11.2

(11.2 x 1/4 x 1000) / 230 = 12.2A

Starting the motor requires 12.2 amperes.

S-0624

## 11-9. How Much Power Can Generator Supply?




1 Limit Load To 90% Of Generator Output

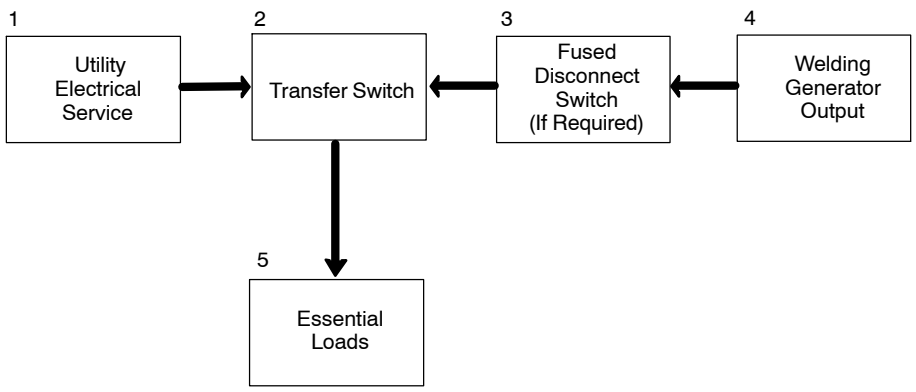
Always start non-resistive (motor) loads in order from largest to smallest, and add resistive loads last.

2 5 Second Rule

If motor does not start within 5 seconds, turn off power to prevent motor damage. Motor requires more power than generator can supply.

Ref. ST-800 396-A / S-0625

## 11-10. Typical Connections To Supply Standby Power




⚠ **Have only qualified persons perform these connections according to all applicable codes and safety practices.**

⚠ **Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.**

☞ *Customer-supplied equipment is required if generator will supply standby power during emergencies or power outages.*

1 Utility Electrical Service

2 Transfer Switch (Double-Throw)

Switch transfers the electrical load from electric utility service to the generator. Transfer load back to electric utility when service is restored.

Install correct switch (customer-supplied). Switch rating must be same as or greater than the branch overcurrent protection.

3 Fused Disconnect Switch

Install correct switch (customer-supplied) if required by electrical code.

4 Welding Generator Output

Generator output voltage and wiring must be consistent with regular (utility) system voltage and wiring.

Connect generator with temporary or permanent wiring suitable for the installation.

Turn off or unplug all equipment connected to generator before starting or stopping engine. When starting or stopping, the engine has low speed which causes low voltage and frequency.

5 Essential Loads

Generator output may not meet the electrical requirements of the premises. If generator does not produce enough output to meet all requirements, connect only essential loads (pumps, freezers, heaters, etc. – See Section 11-4).

## 11-11. Selecting Extension Cord (Use Shortest Cord Possible)

**Cord Lengths for 120 Volt Loads**

**If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

| Current (Amperes) | Load (Watts) | Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)* | | | | | |
|---|---|---|---|---|---|---|---|
| | | 4 | 6 | 8 | 10 | 12 | 14 |
| 5 | 600 | | | 350 (106) | 225 (68) | 137 (42) | 100 (30) |
| 7 | 840 | | 400 (122) | 250 (76) | 150 (46) | 100 (30) | 62 (19) |
| 10 | 1200 | 400 (122) | 275 (84) | 175 (53) | 112 (34) | 62 (19) | 50 (15) |
| 15 | 1800 | 300 (91) | 175 (53) | 112 (34) | 75 (23) | 37 (11) | 30 (9) |
| 20 | 2400 | 225 (68) | 137 (42) | 87 (26) | 50 (15) | 30 (9) | |
| 25 | 3000 | 175 (53) | 112 (34) | 62 (19) | 37 (11) | | |
| 30 | 3600 | 150 (46) | 87 (26) | 50 (15) | 37 (11) | | |
| 35 | 4200 | 125 (38) | 75 (23) | 50 (15) | | | |
| 40 | 4800 | 112 (34) | 62 (19) | 37 (11) | | | |
| 45 | 5400 | 100 (30) | 62 (19) | | | | |
| 50 | 6000 | 87 (26) | 50 (15) | | | | |

*Conductor size is based on maximum 2% voltage drop

**Cord Lengths for 240 Volt Loads**

**If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

| Current (Amperes) | Load (Watts) | Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)* | | | | | |
|---|---|---|---|---|---|---|---|
| | | 4 | 6 | 8 | 10 | 12 | 14 |
| 5 | 1200 | | | 700 (213) | 450 (137) | 225 (84) | 200 (61) |
| 7 | 1680 | | 800 (244) | 500 (152) | 300 (91) | 200 (61) | 125 (38) |
| 10 | 2400 | 800 (244) | 550 (168) | 350 (107) | 225 (69) | 125 (38) | 100 (31) |
| 15 | 3600 | 600 (183) | 350 (107) | 225 (69) | 150 (46) | 75 (23) | 60 (18) |
| 20 | 4800 | 450 (137) | 275 (84) | 175 (53) | 100 (31) | 60 (18) | |
| 25 | 6000 | 350 (107) | 225 (69) | 125 (38) | 75 (23) | | |
| 30 | 7000 | 300 (91) | 175 (53) | 100 (31) | 75 (23) | | |
| 35 | 8400 | 250 (76) | 150 (46) | 100 (31) | | | |
| 40 | 9600 | 225 (69) | 125 (38) | 75 (23) | | | |
| 45 | 10,800 | 200 (61) | 125 (38) | | | | |
| 50 | 12,000 | 175 (53) | 100 (31) | | | | |

*Conductor size is based on maximum 2% voltage drop

# SECTION 12 – PARTS LIST

☞ *Hardware is common and not available unless listed.*

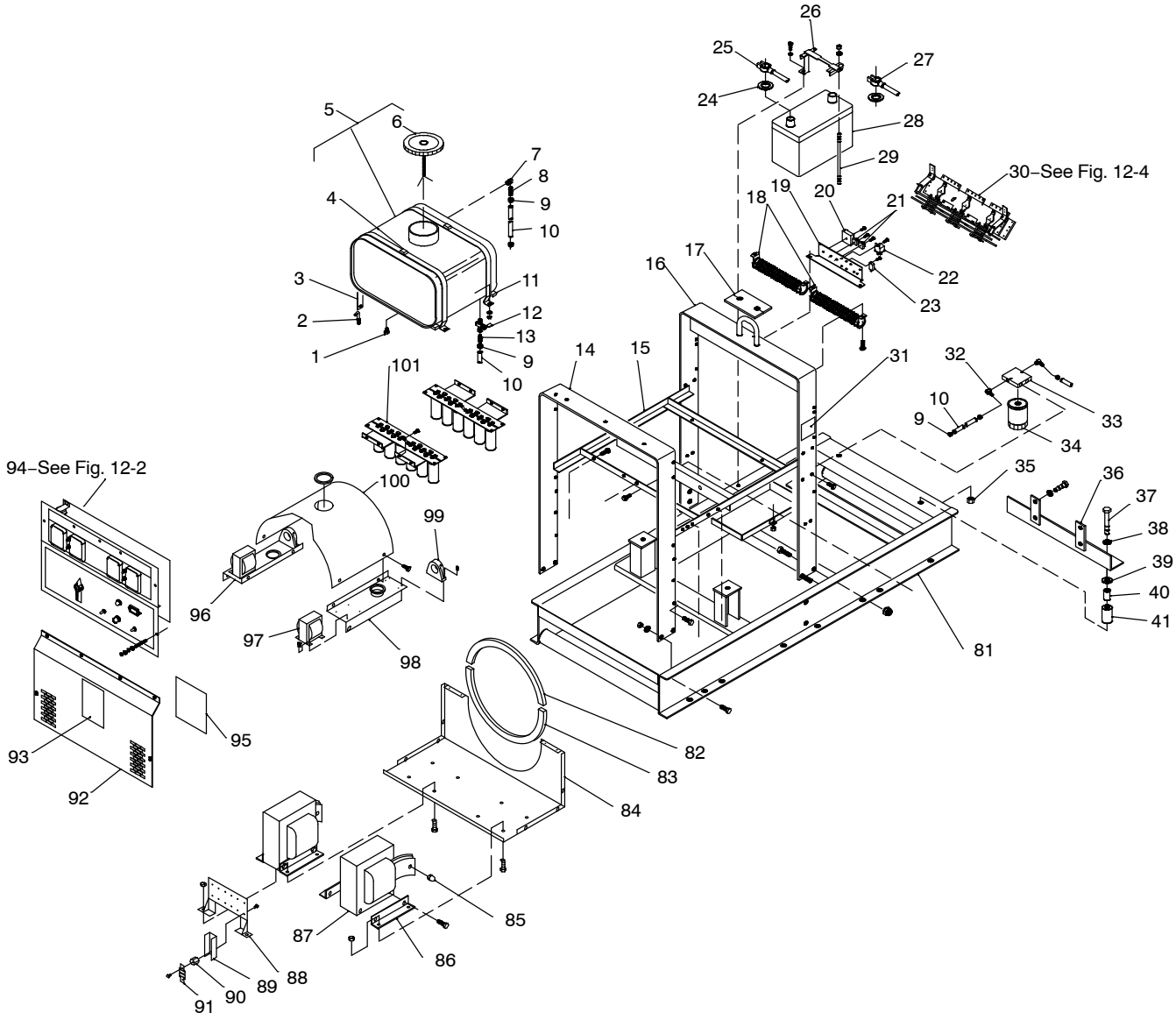
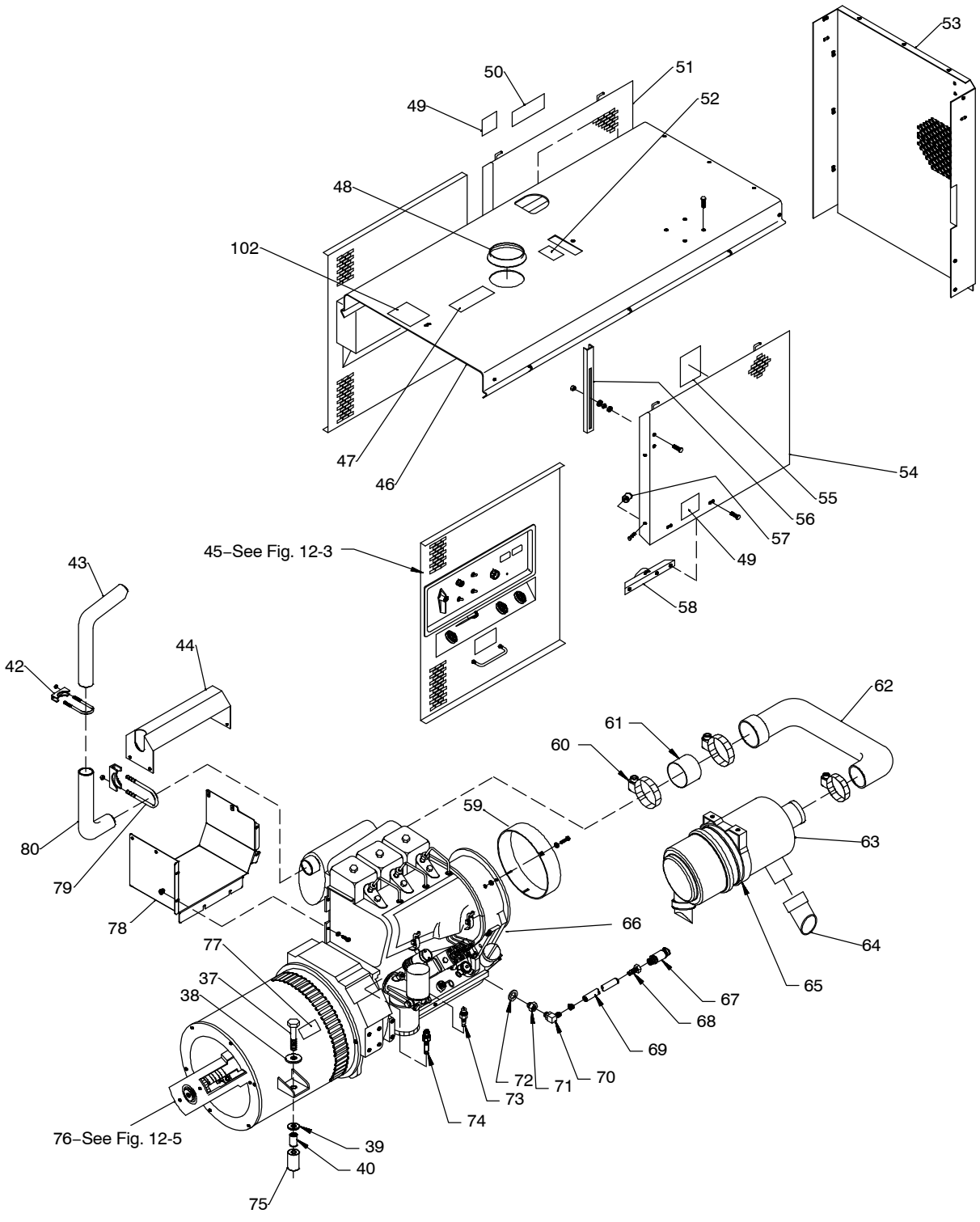



**Figure 12–1. Main Assembly**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45–See Fig. 12-3
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76–See Fig. 12-5
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804 287-A

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|
| | | | **Figure 12–1. Main Assembly** | |
| 1 | | 605 288 | FITTING, pipe galv plug sqhd .250NPT | 1 |
| 2 | | 070 010 | BOLT, J stl .250-20 x 2.750 pld | 2 |
| 3 | | 088 696 | STRAP, hold down fuel tank | 2 |
| 4 | | 134 771 | PLUG, protective .640sq | 2 |
| 5 | | 184 675 | TANK, fuel 22.3gal (includes) | 1 |
| 6 | | 182 022 | . CAP, fuel | 1 |
| 7 | | 020 185 | FITTING, pipe brs elbow st 1/8NPT | 1 |
| 8 | | 053 525 | FITTING, hose brs barbed M 5/16tbg x 1/8NPT | 1 |
| 9 | | 172 071 | CLAMP, hose .520-.605clp dia slfng | 6 |
| 10 | | 134 835 | HOSE, SAE .312 ID x .560 OD (order by ft) | 9ft |
| 11 | | 097 507 | STRIP, rbr adh back .125 x 1.000 x 20.500 60 duro | 2 |
| 12 | | 010 314 | VALVE, shut-off fuel | 1 |
| 13 | | 039 599 | FITTING, brs barbed M 5/16 tbg x 1/4 NPT | 3 |
| 14 | | +048 227 | UPRIGHT, base front | 1 |
| 15 | | 170 689 | FRAME, mtg reactor and fuel tank | 1 |
| 16 | | +170 617 | UPRIGHT, base center | 1 |
| 17 | | 017 479 | SEAL, weather lift eye | 1 |
| 18 | R3, R5 | 097 459 | RESISTOR, WW fxd 375W 20 ohm | 2 |
| 19 | | 216 565 | BRACKET, mounting components | 1 |
| 20 | TD1 | 214 928 | TIMER, delay on make/break open 30 sec 12vdc | 1 |
| 21 | SR4, SR5 | 035 704 | RECTIFIER, Integ bridge 40. amp 800v | 2 |
| 22 | CR5 | 090 104 | RELAY, encl 12vdc spst 30a/15vdc 5pin flange mtg | 1 |
| 23 | CB12 | 205 927 | CIRCUIT BREAKER, auto reset 12vdc 12 amp | 1 |
| 24 | | 108 081 | TERMINAL PROTECTOR, battery post mtg | 2 |
| 25 | | 124 941 | CABLE, bat pos | 1 |
| 26 | | 208 353 | HOLD DOWN, battery | 1 |
| 27 | | 032 453 | CABLE, bat neg | 1 |
| 28 | | 190 896 | BATTERY, stor 12v 660 crk 110 rsv gp 24 low | 1 |
| 29 | | 010 460 | STUD, stl .312-18 x 10.000 | 1 |
| 30 | SR2, SR3 | Figure 12–5. | RECTIFIER ASSEMBLY | 1 |
| 31 | | 013 466 | LABEL, fuel shut-off | 1 |
| 32 | | 145 282 | FITTING, hose brs barbed elbow M 5/16tbg x 1/4NPT | 2 |
| 33 | | 202 242 | BASE, fuel filter assy | 1 |
| 34 | | 192 744 | FILTER, fuel spin–on | 1 |
| 35 | | 135 205 | NUT, 625-11 .94 hex .76H stl pld | 4 |
| 36 | | 116 707 | SUPPORT, front engine | 1 |
| 37 | | 119 849 | SCREW, 625-11 x 4.00 hexhd pln gr 5 pld | 4 |
| 38 | | 071 731 | WASHER, flat stl .656 ID x 2.250 OD x .187thk | 4 |
| 39 | | 071 890 | RETAINER, mount eng/gen | 4 |
| 40 | | 071 730 | TUBING, stl .875 OD x 12ga wall x 2.500 | 4 |
| 41 | | 072 848 | MOUNT, eng/gen nprn .875 ID x 2.500 OD x 2.000 50 dur | 2 |
| 42 | | 010 875 | CLAMP, muffler 2.000 dia | 1 |
| 43 | | 105 734 | PIPE, muffler extension elbow 1.750 OD | 1 |
| 44 | | 176 232 | BAFFLE, air muffler exhaust | 1 |
| 45 | | Figure 12–3. | SIDE CONTROL PANELS | 2 |
| 46 | | +105 909 | COVER, top | 1 |
| 47 | | 192 041 | LABEL, use diesel fuel only | 1 |
| 48 | | 035 968 | WASHER, flat rbr 3.625 ID x 5.875 OD x .062thk | 1 |
| 49 | | 158 610 | LABEL, warning electric shock | 2 |
| 50 | | 168 385 | LABEL, warning battery explosion | 1 |
| 51 | | +192 313 | DOOR, side LH | 1 |
| 52 | | 222 513 | LABEL, warning falling equipment can cause serious | 2 |
| 53 | | 117 257 | PANEL, end engine | 1 |
| 54 | | +192 314 | DOOR, side RH | 1 |
| 55 | | 225 589 | LABEL, diesel engine maintenance f–3l914 | 1 |
| 56 | | 004 130 | BRACKET, support door | 2 |

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 12–1. Main Assembly (Continued)**

| | | | | |
|---|---|---|---|---|
| 57 | | 087 341 | BUMPER, door 1.000 OD x .750 high | 4 |
| 58 | | 087 336 | LATCH | 2 |
| 59 | | 048 213 | BAFFLE, air intake | 1 |
| | | 194 467 | WASHER, flat (for baffle) 6.25 ID x 11.50 OD x .62 T buna | 1 |
| 60 | | 023 313 | CLAMP, hose 3.250-3.000 clp dia slftg | 3 |
| 61 | | 225 643 | TUBE, air intake | 1 |
| 62 | | 225 642 | HOSE, air cleaner | 1 |
| 63 | | 189 764 | AIR CLEANER, intake | 1 |
| 64 | | 165 785 | HOSE, air cleaner 2.500 id | 1 |
| | | *192 938 | FILTER, air element primary | 1 |
| | | *♦192 939 | FILTER, air element safety | 1 |
| 65 | | 203 460 | BRACKET, mtg air cleaner | 1 |
| 66 | | 237 006 | ENGINE, Deutz dsl elec D914L03i (includes) | 1 |
| | | *249605 | .... FILTER, oil | 1 |
| | | *249606 | .... FILTER, fuel secondary | 1 |
| | | *066 271 | .... V–BELT | 1 |
| | | 246989 | KIT, Filter (Includes Fuel, Oil, And Air Filters) | 1 |
| | | 199 507 | HOSE ASSY, oil drain 20.000 lg (includes) | 1 |
| 67 | | 165 271 | .... VALVE, oil drain 3/8–18 nptf | 1 |
| 68 | | 176 529 | .. FTG, hose brs barbed fem 1/2 tbg x 3/8 npt | 1 |
| 69 | | 113 854 | .... HOSE, sae .500 id x .780 od xcoil | 1.66ft |
| | | 023 562 | CLAMP, hose .312 – .875 clp dia | 1 |
| 70 | | 176 528 | FTG, hose brs barbed elbow m 1/2 tbg x 1/2 npt | 1 |
| 71 | | 206 906 | ADAPTER, oil drain fitting | 1 |
| 72 | | 047 235 | WASHER, seal oil copper .879id x 1.059od 111–8737 | 1 |
| 73 | | 195 745 | SWITCH, pressure oil 1.5 bar nc cont | 1 |
| 74 | | 195 746 | SENDER, coolant temp & 130c switch | 1 |
| 75 | | 083 476 | MOUNT, eng/gen nprn .875 ID x 2.500 OD x 2.000 60 dur | 2 |
| 76 | Figure 12–4. | | GENERATOR | 1 |
| 77 | | 225 120 | LABEL, warning moving parts can cause injury | 2 |
| 78 | | 176 236 | BAFFLE, air outlet | 1 |
| 79 | | | CLAMP, muffler (included with engine) | 1 |
| 80 | | 105 733 | PIPE, muffler extension elbow 1.875 OD | 1 |
| 81 | | 165 739 | BASE | 1 |
| 82 | | 191 446 | EXTRUSION, rubber w/adhesive 1.000 x 1.000 D (order by ft) | 2.1ft |
| 83 | | 173 352 | EXTRUSION, rubber clamp/bulb (order by ft) | 2.4ft |
| 84 | | 192 305 | TRAY, base | 1 |
| 85 | | 176 167 | NUT, 250-20 acorn nylon | 6 |
| 86 | | 192 303 | ANGLE, mtg stabilizer | 4 |
| 87 | Z1, Z2 | 192 296 | STABILIZER | 2 |
| 88 | | 205 791 | BRACKET, mtg fuse assembly (includes) | 1 |
| 89 | | 204 965 | .... STRIP, insulation | 6 |
| 90 | | 026947 | .... STAND-OFF, insul .250-20 x 1.0 | 12 |
| 91 | F11-13, F21-23 | 027 267 | FUSE, link 300 A 250 volt | 6 |
| 92 | | 192 304 | PANEL, front lower | 1 |
| 93 | | 233 953 | LABEL, warning general precautionary CSA | 1 |
| 94 | Figure 12–2. | | FRONT PANEL | 1 |
| 95 | | 175 256 | INSULATOR, side RH | 1 |
| 96 | | 192 300 | SHROUD, generator LH | 1 |
| 97 | T2, T4 | 192 371 | TRANSFORMER, 115V pri 24VCT 8A w/leads | 2 |
| 98 | | 192 301 | SHROUD, generator RH | 1 |
| 99 | | 168 829 | TRANSDUCER, current 1000A module max open loop | 2 |
| 100 | | 192 299 | SHROUD, generator center | 1 |
| 101 | | 194 021 | CAPACITOR ASSEMBLY, (includes) | 2 |
| | | 162 817 | .... BUS BAR, capacitor | 2 |
| | C15, C20 | 163 535 | .... CAPACITOR, elctlt | 6 |
| | R4, R6 | 140 002 | .... RESISTOR, WW fxd 10W | 1 |
| | | 162 799 | .... BRACKET, mtg capacitors | 2 |

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 12–1. Main Assembly (Continued)**

. 102 . . . . . 233 088 . . LABEL, danger using a generator indoors can kill you in minutes (unit) . . . 1
. . . . . 193 501 . . KIT, label (includes safety and informational labels) . . . . . 1

+When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit 193 501

*Recommended Spare Parts.

♦OPTIONAL

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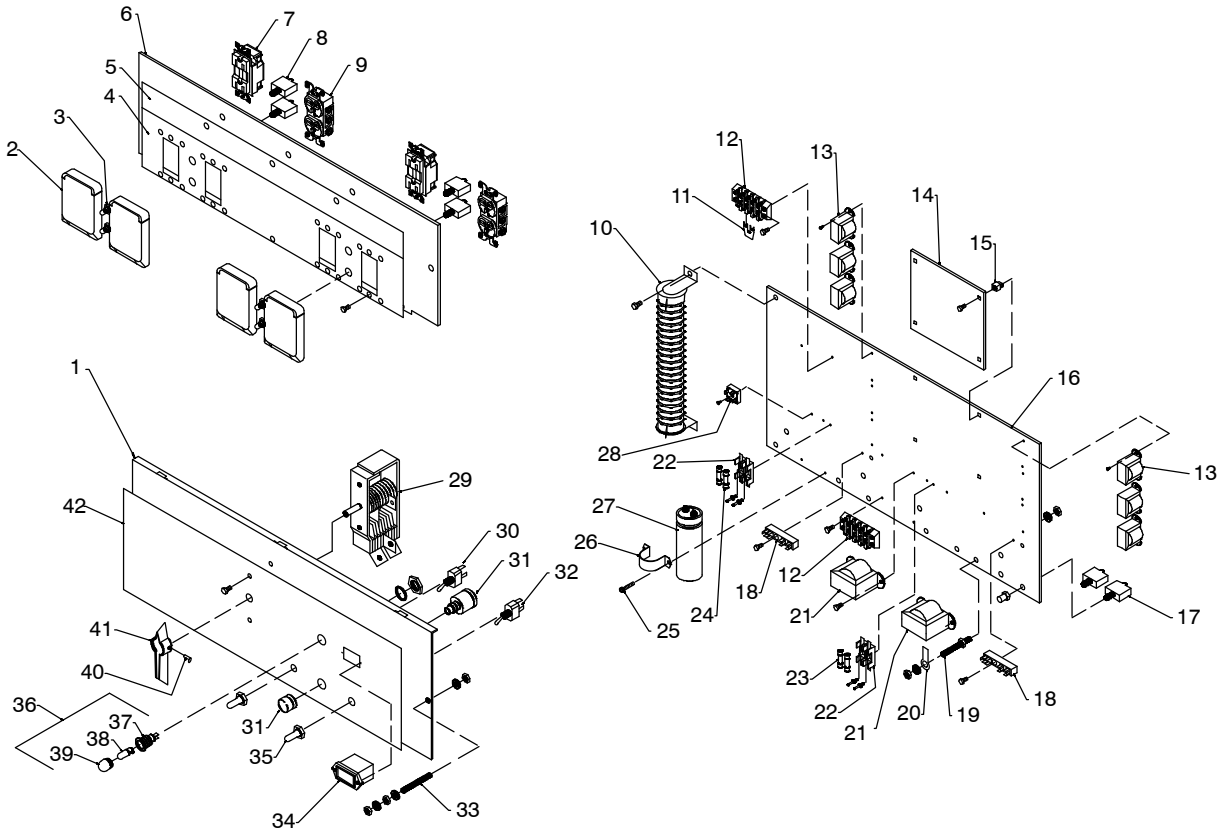
☞ *Hardware is common and not available unless listed.*




804 290-A

**Figure 12–2. Front Panel**

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|
| | | | **Figure 12–2. Front Panel (Figure 12–1. Item 94)** | |
| 1 | | 225 550 | PANEL, front control | 1 |
| 2 | | 209 056 | COVER, receptacle w/gasket | 4 |
| 3 | | 206 795 | BOOT, circuit breaker | 4 |
| 4 | | | PLATE, ident control rating (order by model and serial number) | 1 |
| 5 | | 190 375 | NAMEPLATE | 1 |
| 6 | | 216 270 | PANEL, aux power | 1 |
| 7 | GFCI1,2 | 246 865 | RECEPTACLE, str dx grd 2P3W 20A 125V GFCI | 2 |
| 8 | CB1-4 | 093 996 | SUPPLEMENTARY PRO, man reset 1p 20a 250vac frict | 4 |
| 9 | RC1, RC2 | 193 257 | RECEPTACLE, str dx grd 2P3W 15/20A 250V | 2 |
| 10 | R10 | 189 699 | RESISTOR, WW tap 375W | 1 |
| 11 | | 038 620 | LINK, jumper term blk 30A | 2 |
| 12 | TE1,2 | 038 621 | BLOCK, term 30A 4 pole | 2 |
| 13 | T5 - 10 | 210 636 | TRANSFORMER, control 6VA 120VCT | 6 |
| 14 | PC4 | 191 255 | CIRCUIT CARD ASSEMBLY, field current regulator | 1 |
| 15 | | 083 147 | GROMMET, SCR NO 8/10 panel | 4 |
| 16 | | 192 332 | PANEL LAYOUT, mtg component | 1 |
| 17 | CB7,8 | 139 266 | SUPPLEMENTARY PROTECTOR, man reset 1p 15a 250vac | 2 |
| | | 206 795 | BOOT, circuit breaker clear hex nut | 2 |
| 18 | 1T,2T | 190 210 | BLOCK, term 5-3-3 | 2 |
| 19 | | 083 030 | STUD, brs .250-20 x 1 | 1 |
| 20 | | 010 381 | CONNECTOR, rectifier | 1 |
| 21 | T1, T3 | 192 367 | TRANSFORMER, control | 2 |
| 22 | | 184 649 | HOLDER, fuse mintr .250 | 4 |
| 23 | F3,4 | *012 643 | FUSE, mintr gl slo-blo 1A, 250V | 2 |
| 24 | F1,2 | *125 847 | FUSE, mintr cer slo-blo 12A, 250V | 2 |
| 25 | | 129 351 | SCREW, 008–32x .50 hexwhd.34d stl pld slffmg tap–rw | 2 |
| 26 | | 177 136 | CLAMP, capacitor 1.375dia | 1 |
| 27 | C1 | 087 110 | CAPACITOR, elctlt 240 | 1 |
| 28 | SR1 | 035 704 | RECTIFIER, integ bridge | 1 |
| 29 | S2 | 192 292 | SWITCH, paralleling | 1 |
| 30 | S4 | ♦021 467 | SWITCH, tgl spst 3a 250v off–none–(on) spd term | 1 |
| | | ♦021 385 | BOOT, toggle switch lever | 1 |
| 31 | PB1 | 046 433 | SWITCH, pb mc no spst 35a | 1 |
| 32 | S14 | 199 691 | SWITCH,tgl spdt 6a 125vac on–none–mc spd term | 1 |
| 33 | | 083 030 | STUD | 1 |
| 34 | HM | 210 424 | METER, hour 12-24VDC | 1 |
| 35 | | 021 385 | BOOT, toggle switch lever | 1 |
| 36 | PL1 | 188 266 | LIGHT, ind red lens 13V (includes) | 1 |
| 37 | | 082 788 | HOLDER, light ind only | 1 |
| 38 | | 048 155 | BULB, incand min | 1 |
| 39 | | 082 789 | LENS, light ind red | 1 |
| 40 | | 010 647 | PIN, spring CS .156 x 1.250 | 1 |
| 41 | | 111 785 | HANDLE, switch | 1 |
| 42 | | | PLATE, ident control rating (order by model and serial number) | 1 |

*Recommended Spare Parts.

♦OPTIONAL

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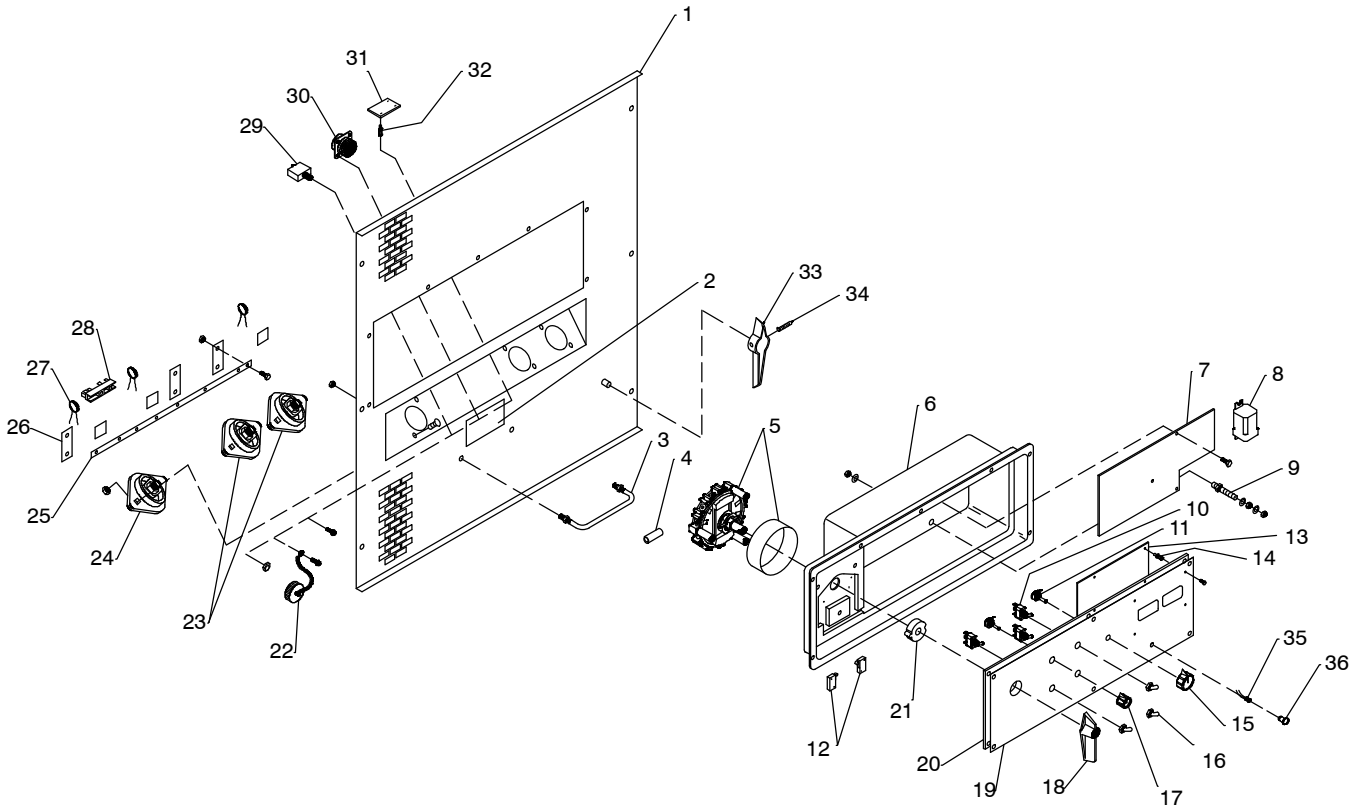
☞ *Hardware is common and not available unless listed.*




802 320-A

**Figure 12–3. Side Control Panels – Welder B (Right) Side Shown**

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 12–3. Side Control Panels (Figure 12–1. Item 45)**

| | | | | |
|---|---|---|---|---|
| 1 | | +192 330 | PANEL, side output RH | 1 |
| 1 | | +192 325 | PANEL, side output LH | 1 |
| 2 | | 027 434 | LABEL, welder will not start by applying power to terminals | 2 |
| 3 | | 010 828 | HANDLE | 2 |
| 4 | | 086 074 | TUBING, cop .540 ID x .123 wall x .562 – welder A (left) side only | 1 |
| 5 | S1, S9 | 204 903 | SWITCH, mode single w/ dust cover (includes) | 2 |
| | | 163 557 | SWITCH, mode single | 1 |
| | | 202 881 | COVER, dust | 1 |
| 6 | | 159 863 | ELECTRONICS BOX | 2 |
| 7 | PC5 | 204 832 | CIRCUIT CARD ASSEMBLY, welder B (right) side control | 1 |
| | PC1 | 204 835 | CIRCUIT CARD ASSEMBLY, welder A (left) side control | 1 |
| 8 | CR2, CR3 | 000 770 | RELAY, encl 24VDC 3PDT 10A/120VAC 11 pin | 2 |
| 9 | GRD | 185 011 | STUD, primary board brs 10-32 x 1.592 | 2 |
| 10 | S3,6,7,8,10,11 | 011 609 | SWITCH, tgl SPDT 15A 125VAC on-none-on | 6 |
| 11 | R1,2,7,8 | 035 897 | POTENTIOMETER, cp std slot 1t 2w 1k linear | 4 |
| 12 | LS1,2,3,4 | 089 645 | SWITCH, lim 11A 125V | 4 |
| 13 | PC2, PC6 | 231 149 | CIRCUIT CARD ASSEMBLY, display w/program | 2 |
| 14 | | 165 316 | STAND-OFF, No. 6-32 x .875 lg .312 hex nyl | 8 |
| 15 | | 097 924 | KNOB, pointer 1.625dia x .250 ID | 2 |
| 16 | | 021 385 | BOOT, toggle switch lever | 6 |
| 17 | | 097 922 | KNOB, pointer .875dia x .250 ID | 2 |
| 18 | | 148 956 | HANDLE, switch | 2 |
| 19 | | | NAMEPLATE (order by model and serial number) | 2 |
| 20 | | 162 815 | PANEL, front upper | 2 |
| 21 | | 161 297 | CAM, switch selector 2posn | 2 |
| 22 | | 170 391 | CONNECTOR, circ protective cap | 2 |
| 23 | | 241 432 | TERMINAL, pwr output red | 4 |
| 24 | | 241 433 | TERMINAL, pwr output black | 2 |
| 25 | | 192 494 | BUS BAR, connecting | 2 |
| 26 | | 192 493 | STAND-OFF, bus bar | 6 |
| 27 | C2,4,5,21,22,23 | 136 736 | CAPACITOR, cer disc .1uf 500VDC | 6 |
| 28 | 3T, 4T | 190 210 | BLOCK, term 5-3-3 | 2 |
| 29 | CB5, CB6 | 139 266 | SUPPLEMENTARY PROTECTOR, man reset 1p 15a 250vac | 2 |
| 30 | RC8, RC9 | 134 735 | CONNECTOR, circ MS/CPC 14skt | 2 |
| 31 | PC3, PC7 | 181 261 | CIRCUIT CARD ASSEMBLY, filter | 2 |
| 32 | | 165 316 | STAND-OFF, No. 6-32 x .875 lg .312 hex nyl | 6 |
| 33 | | ♦059 773 | HANDLE, switch | 2 |
| 34 | | ♦010 647 | PIN, spring | 2 |
| | | ♦091 067 | SWITCH, polarity | 2 |
| | | ♦199 123 | LABEL, component identification master polarity | 1 |
| | | ♦199 124 | LABEL, component identification slave polarity | 1 |
| 35 | PL2, PL3 | 159 522 | LED, yellow 2.1v 20 ma 45.0 mcd panel mtg .250 hole | 2 |
| 36 | | 159 036 | LENS, led clear panel mtg | 2 |

+When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit 193 501

♦OPTIONAL

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

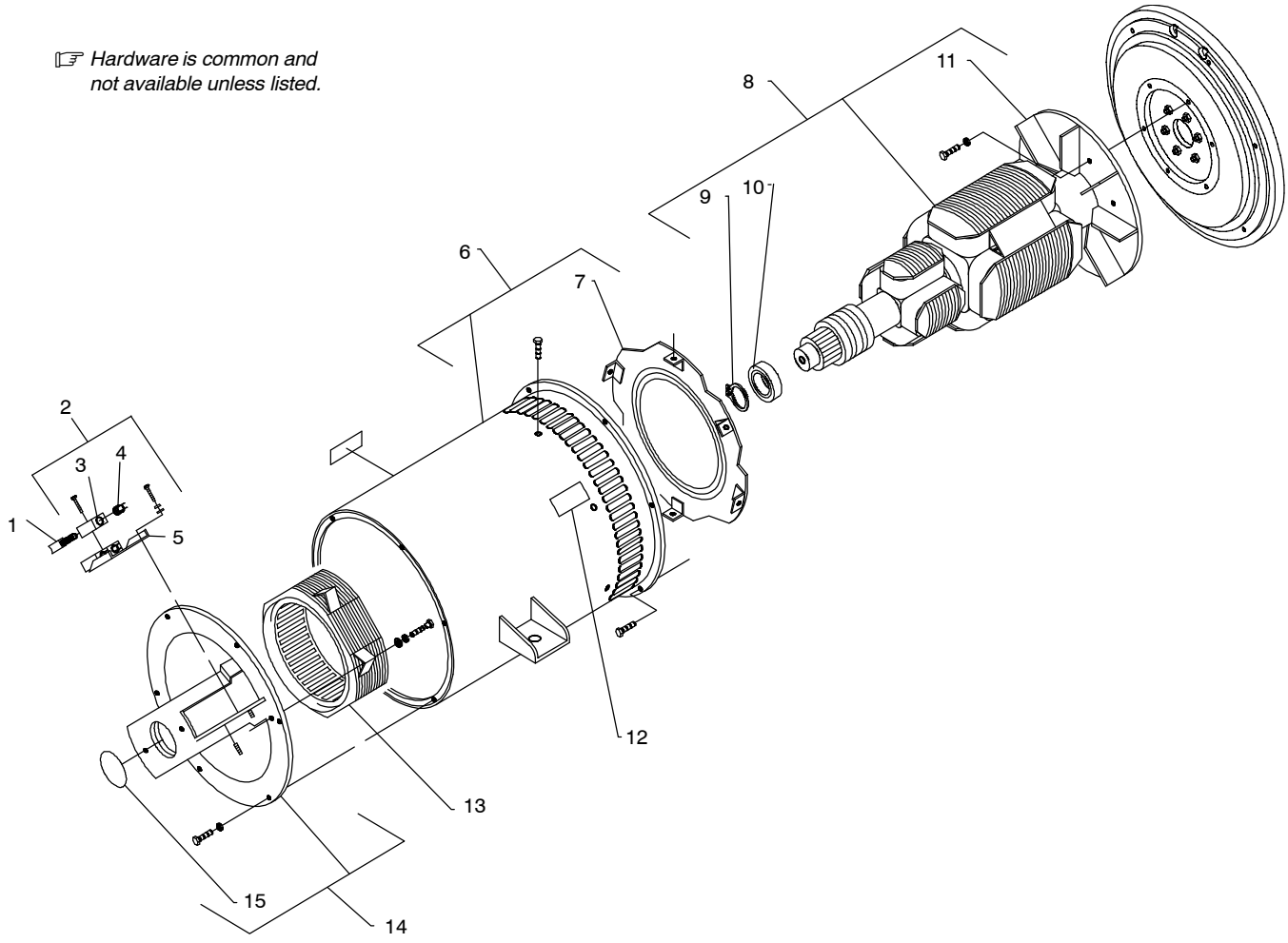



**Figure 12–4. Generator**

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 12–4. Generator (Figure 12–1. Item 76)**

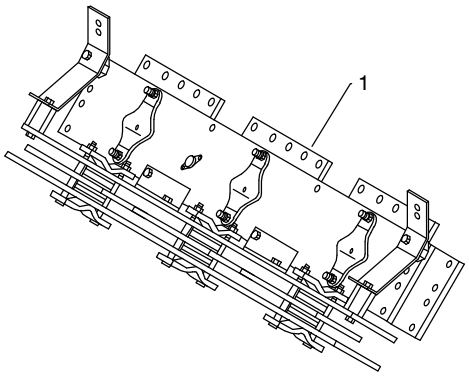
| | | | | |
|---|---|---|---|---|
| .. 1 | | *151 299 | .. BRUSH, contact elect clrg .375 x .750 | 3 |
| .. 2 | | 188 387 | .. BRUSHHOLDER/BRACKET ASSEMBLY, (includes) | 1 |
| .. 3 | | 600 270 | .... HOLDER, brush | 3 |
| .. 4 | | 152 044 | .... CAP, holder brush | 3 |
| .. 5 | | 173 066 | .... BRACKET, mtg brushholder | 1 |
| .. 6 | | +205 600 | .. STATOR, generator (includes) | 1 |
| .. 7 | | 039 207 | .... BAFFLE, air generator | 1 |
| .. 8 | | 192 286 | .. ROTOR, generator (includes) | 1 |
| .. 9 | | 024 617 | .... RING, retaining external | 1 |
| .. 10 | | 053 390 | .... BEARING, ball | 1 |
| .. 11 | | 083 748 | .... FAN, rotor | 1 |
| .. 12 | | 225 120 | .. LABEL, warning moving parts can cause injury | 2 |
| .. 13 | | 195 704 | .. STATOR, exciter aux pwr 120/240 | 1 |
| .. 14 | | 173 068 | .. ENDBELL, generator (includes) | 1 |
| .. 15 | | 143 220 | .... O-RING 2.859ID x .139CS | 1 |

+When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit 193 501

*Recommended Spare Parts.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☞ *Hardware is common and not available unless listed.*




802 319

**Figure 12–5. Rectifier Assembly**

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|
| | | | **Figure 12–5. Rectifier (Figure 12–1. Item 30)** | |
| 1 | | 205 613 | RECTIFIER ASSEMBLY | 1 |
| | | 203 001 | RECTIFIER, Si Diode (One Side Service kit W/Varnish Coating) | 1 |
| | PLG1, PLG2 | 158 720 | CONNECTOR & SOCKETS | 1 |

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☞ *Some wiring harness components (switches, relays, supplementary protectors) are also referenced elsewhere in this parts list. Purchase components separately or as part of the associated wiring harness.*

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|
| | | | **Wiring Harnesses** | |
| | | 195 702 | **HARNESS, wiring component panel (includes)** | 1 |
| | | 188 512 | SEAL, wire univ 6P/S 3 row | 3 |
| | | 187 651 | SEAL, wire univ 9P/S 3 row | 3 |
| | RC13,21 | 116 045 | HOUSING, plugs and pins | 2 |
| | PLG17 | 135 275 | HOUSING, plugs and pins | 1 |
| | RC19, PLG20 | 168 071 | HOUSING, plugs and pins | 1 |
| | | 192 218 | **HARNESS, wiring control box welder B (right) (includes)** | 1 |
| | CR3 | 000 770 | RELAY, encl 24VDC 3PDT 10A/120VAC 11 pin | 1 |
| | GRD | 185 011 | STUD, primary board brs 10-32 x 1.592 | 1 |
| | S8,10,11 | 011 609 | SWITCH, tgl SPDT 15A 125VAC on-none-on | 3 |
| | R7,8 | 035 897 | POTENTIOMETER, cp std slot 1t 2w 1k linear | 2 |
| | LS3, 4 | 089 645 | SWITCH, lim 11A 125V | 2 |
| | PLG27 | 131 056 | CONNECTOR, housing plug pins and sockets | 1 |
| | | 187 651 | SEAL, wire univ 9P/S 3 row | 1 |
| | PLG20 | 168 071 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG9,26 | 148 439 | CONNECTOR, housing plug pins and sockets | 2 |
| | PLG12 | 152 249 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG10 | 153 501 | CONNECTOR, housing plug pins and sockets | 1 |
| | RC22 | 168 845 | CONNECTOR, housing plug pins and sockets | 1 |
| | RC23 | 168846 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG8 | 169 240 | CONNECTOR, housing plug pins and sockets | 1 |

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|
| | | | **Wiring Harnesses** | |
| | | 192 208 | **HARNESS, wiring control box welder A (left) (includes)** | 1 |
| | CR2 | 000 770 | RELAY, encl 24VDC 3PDT 10A/120VAC 11 pin | 1 |
| | GRD | 185 011 | STUD, primary board brs 10-32 x 1.592 | 1 |
| | S3,6,7 | 011 609 | SWITCH, tgl SPDT 15A 125VAC on-none-on | 3 |
| | R1,8 | 035 897 | POTENTIOMETER, cp std slot 1t 2w 1k linear | 2 |
| | LS1,2 | 089 645 | SWITCH, lim 11A 125V | 2 |
| | PLG18 | 131 056 | CONNECTOR, housing plug pins and sockets | 1 |
| | | 187 651 | SEAL, wire univ 9P/S 3 row | 1 |
| | PLG19 | 168 071 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG4,11 | 148 439 | CONNECTOR, housing plug pins and sockets | 2 |
| | PLG5 | 152 249 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG10 | 153 501 | CONNECTOR, housing plug pins and sockets | 1 |
| | RC6 | 168 845 | CONNECTOR, housing plug pins and sockets | 1 |
| | RC7 | 168846 | CONNECTOR, housing plug pins and sockets | 1 |
| | PLG3 | 169 240 | CONNECTOR, housing plug pins and sockets | 1 |
| | | 192 336 | **HARNESS, wiring unit welder B (right) (includes)** | 1 |
| | 4T | 190 210 | BLOCK, term 5-3-3 | 1 |
| | CB6 | 139 266 | SUPPLEMENTARY PROTECTOR, man reset 1p 15a 250vac | 1 |
| | RC9 | 134 735 | CONNECTOR, circ MS/CPC 14skt | 1 |
| | PC7 | 181 261 | CIRCUIT CARD ASSEMBLY, filter | 1 |
| | PLG24 | 115 094 | HOUSING, plug and sockets | 1 |
| | PLG22 | 168 847 | HOUSING, plug pins and sockets | 1 |
| | PLG23 | 152 249 | HOUSING, plug pins and sockets | 1 |
| | PLG21 | 135 556 | HOUSING, plug pins and sockets | 1 |
| | | 188 512 | SEAL, wire univ 6P/S 3 row | 1 |
| | | 192 337 | **HARNESS, wiring unit welder A (left) (includes)** | 1 |
| | 3T | 190 210 | BLOCK, term 5-3-3 | 1 |
| | CB5 | 139 266 | SUPPLEMENTARY PROTECTOR, man reset 1p 15a 250vac | 1 |
| | RC8 | 134 735 | CONNECTOR, circ MS/CPC 14skt | 1 |
| | PC3 | 181 261 | CIRCUIT CARD ASSEMBLY, filter | 1 |
| | PLG14 | 115 094 | HOUSING, plug and sockets | 1 |
| | PLG6 | 168 847 | HOUSING, plug pins and sockets | 1 |
| | PLG3 | 152 249 | HOUSING, plug pins and sockets | 1 |
| | PLG13 | 135 556 | HOUSING, plug pins and sockets | 1 |
| | | 188 512 | SEAL, wire univ 6P/S 3 row | 1 |
| | | 225 595 | **HARNESS, engine du−op (includes)** | 1 |
| | PB1 | 046 433 | SWITCH, pb mc no spst 35a 12vdc w/black cap | 1 |
| | S14 | 199 691 | SWITCH, tgl spdt 6a 125vac on−none−mc spd term | 1 |
| | SR4,5 | 035 704 | RECTIFIER, integ bridge 40. amp 800v | 2 |
| | | 192 334 | **HARNESS, aux power panel (includes** | 1 |
| | GFCI1,2 | 151 981 | RCPT, str dx grd 2p3w 15/20a 125v *5−20r gfi | 2 |
| | RC1,2 | 193 257 | RCPT, str dx grd 2p3w 15/20a 250v *6−20r | 2 |
| | CB1,2,3,4 | 093 996 | SUPPLEMENTARY PRO, man reset 1p 20a 250vac frict | 4 |

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# TRUE BLUE® WARRANTY

## Effective January 1, 2010
## (Equipment with a serial number preface of MA or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the equipment to the original end-user purchaser, and not to exceed one year after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers only to include SCRs, diodes, and discrete rectifier modules
2. 3 Years — Parts and Labor
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
   * Inverter Power Sources (Unless Otherwise Stated)
   * Plasma Arc Cutting Power Sources
   * Process Controllers
   * Semi-Automatic and Automatic Wire Feeders
   * Smith 30 Series Flowgauge and Flowmeter Regulators (No Labor)
   * Transformer/Rectifier Power Sources
   * Water Coolant Systems (Integrated)
3. 2 Years — Parts
   * Auto-Darkening Helmet Lenses (No Labor)
4. 1 Year — Parts and Labor Unless Specified
   * Automatic Motion Devices
   * CoolBelt and CoolBand Blower Unit (No Labor)
   * External Monitoring Equipment and Sensors
   * Field Options (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * RFCS Foot Controls (Except RFCS-RJ45)
   * Fume Extractors
   * HF Units
   * ICE Plasma Cutting Torches (No Labor)
   * Induction Heating Power Sources, Coolers, and Electronic Controls/Recorders
   * Load Banks
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * PAPR Blower Unit (No Labor)
   * Positioners and Controllers
   * Racks
   * Running Gear/Trailers
   * Spot Welders
   * Subarc Wire Drive Assemblies
   * Water Coolant Systems (Non-Integrated)
   * Weldcraft-Branded TIG Torches (No Labor)
   * Work Stations/Weld Tables (No Labor)
5. 6 Months — Parts
   * Batteries
   * Bernard Guns (No Labor)
   * Tregaskiss Guns (No Labor)
6. 90 Days — Parts
   * Accessory (Kits)
   * Canvas Covers
   * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
   * M-Guns
   * MIG Guns and Subarc (SAW) Guns
   * Remote Controls and RFCS-RJ45
   * Replacement Parts (No labor)
   * Roughneck Guns
   * Spoolmate Spoolguns

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

# Owner's Record

Please complete and retain with your personal records.

| | |
|---|---|
| Model Name | Serial/Style Number |
| Purchase Date | (Date which equipment was delivered to original customer.) |
| Distributor | |
| Address | |
| City | |
| State | Zip |

# For Service

***Contact a DISTRIBUTOR or SERVICE AGENCY near you.***

Always provide Model Name and Serial/Style Number.

| | |
|---|---|
| Contact your Distributor for: | Welding Supplies and Consumables<br>Options and Accessories<br>Personal Safety Equipment<br>Service and Repair<br>Replacement Parts<br>Training (Schools, Videos, Books)<br>Technical Manuals (Servicing Information and Parts)<br>Circuit Diagrams<br>Welding Process Handbooks<br>To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller |
| Contact the Delivering Carrier to: | File a claim for loss or damage during shipment.<br>For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department. |

**Miller Electric Mfg. Co.**
An Illinois Tool Works Company
1635 West Spencer Street
Appleton, WI 54914 USA

**International Headquarters–USA**
USA Phone: 920-735-4505 Auto-Attended
USA & Canada FAX: 920-735-4134
International FAX: 920-735-4125

For International Locations Visit
www.MillerWelds.com

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